DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
S. W. STRATTON, DIRECTOR

MISCELLANEOUS PUBLICATIONS—No. 43

Weights and Measures

Thirteenth Annual Conference

OF REPRESENTATIVES FROM VARIOUS STATES
HELD AT THE BUREAU OF STANDARDS
WASHINGTON, D. C., MAY 24, 25, 26, AND 27, 1920

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1921

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REPORT OF THE THIRTEENTH ANNUAL CONFERENCE ON WEIGHTS AND MEASURES OF THE UNITED STATES.

HELD AT THE BUREAU OF STANDARDS, WASHINGTON, D. C., MAY 24-27, 1920.

FIRST SESSION (MORNING OF MONDAY, MAY 24, 1920).

The conference was called to order at 11 o'clock a. m. by Dr. S. W. Stratton, president of the conference and Director of the Bureau of Standards.

ADDRESS OF WELCOME BY THE PRESIDENT, DR. S. W. STRATTON.

Gentlemen of the conference, it gives me very great pleasure to welcome you to the Bureau of Standards this morning. We are always pleased to see the return of the members who were with us in the beginning, and I note with great pleasure many familiar faces. We are also pleased to see that we have many new delegates from the old States, some new States represented, and many representatives of manufacturers.

It has been our experience in the past that once a State sends a delegate it gets inoculated with these weights and measures matters, and the interest keeps up. We have not a single case on record where a State has gone backward and consequently the conference in recent years has taken on more of the character of what it was intended to be. I am going to say just a few words about its history and its objects for the benefit of the new men who are with us.

The bureau has realized from the beginning that most of the matters pertaining to weights and measures should continue to be local. There are certain proper functions for the General Government, along weights and measures lines, but the general administration of weights and measures laws is provided for in our system of Government as a local matter. Now, when the bureau first called together this conference it was for several very distinct purposes. We recognized that the whole question of weights and measures was in a very chaotic state. We had gathered together and compiled the laws of the different States. Nearly every State had a law, but only three or four States had paid any attention whatever to these laws. The standards, which had been furnished to the States by the Federal Government, had not been taken care of in many cases and in some cases they had disappeared. In some States they were treated as relics—that is, as historical objects to be carefully guarded. Now, a standard is of no use as a relic. It must be made available to the public, and that process of making it available to the public is, of course, one of your greatest duties. We think that the first step to be taken in the inauguration of a weights and measures inspection

service is to make provision for the individual who wishes to do the right thing, and, consequently, that no State should appoint a weights and measures official and start to detect the men who violate the law and to punish them until the State itself has provided standards and made them available to the people. In providing standards the State should be always in touch with the standards of the Federal Government, since one of the first and primary functions of this Government is the fixing of the standards of weights and measures throughout the country, and in connection with this it should designate a central place where the States can come for comparison of their standards with those of the Government. A second function is that it shall serve as a clearing house for all matters pertaining to weights and measures.

It was extremely interesting in the early days of the conferences, when three or four men who had given attention to these matters got together, to note how differently they handled the same things. Later, from year to year, as new men came and joined the conference, the knowledge that was gained from these older representatives was of great value. It is possible now for a State to start in weights and measures matters with the assistance of the Bureau of Standards and with the assistance of the conference, and the work can be put on a good sound basis much more quickly than was formerly the case.

There are many new things coming up from time to time; many new devices; many new possibilities. Therefore we have always welcomed as guests of this conference the men who are making weights and measures as well as the men who are testing them and using them. It is a fundamental principle of the Bureau of Standards, where we are engaged in standardizing a great many things—it may be a specification of a material or the specification of an instrument, and so on—that in preparing specifications the need for them usually comes from the manufacturer or from the user rather than from the official. There are three parties involved; first, the Government, State, or local official; second, the person concerned in its making; and third, the user of the device. If we are going to issue rules or specifications or set out standards it is nothing more than fair that all of these three parties be represented. We have seen so many cases in the Government where a bureau would arbitrarily write specifications for material and then say to the manufacturers, "That is what we want; you produce it." The man who produces that may believe that he could produce better material. Something may have been specified that was not really a practical thing to make, and consequently the expense of making that material or device was considerably increased. So it is always fair that the manufacturer should have an opportunity to say what can or can not be done. He should be invited to present his side.

This conference from the beginning has welcomed the presentation of new devices, of new things, just as much as it has welcomed the presentation of new methods of doing things on the part of officials from the various States.

We have always taken pains to see that the three factors mentioned heretofore were represented at this conference so that it would be a fair conference with not the slightest domination on the part of the Government. Therefore it is with considerable irritation that I read

lately a pamphlet issued by the American Institute of Weights and Measures, and headed, "Bureaucratic Control of Weighing and Measuring Devices." If there is any man in this whole conference who believes, or has even the slightest suspicion, that there has been anything in the nature of bureaucratic control from the beginning to the present, I wish he would say so. This above-mentioned organization, I presume, is established for the purpose of fighting the adoption of the metric system, but when they assail this conference in that manner it seems to me they are making statements and representations which are absolutely false and which ought to call from every one of you the severest criticism. There is nothing to their charges. I have never in all my experience in connection with the industries or the people of the country seen anything in the same class as this as a misrepresentation. The metric system is a keen, live question, and one which you should all think about. I am pleased to state that the members in the past have given it serious consideration on their own initiative, and we have considered it just one of the many questions which must come up for consideration. There has been no effort whatever to use this conference along any line of promotion of this system. In fact, we have been criticized for not doing so. I wish I could read you some of the letters that have come in criticizing us for not promoting it.

You know, of course, in our form of government the principal demands for legislation usually arise with the people. Congress consists of representatives of the people. About the time the bureau was first established we found pending in Congress several bills with reference to the metric system, and from time to time individuals have been called upon to testify, and as such they are free to testify as to what they believe, but we have felt from the beginning that the question of a change in the system of weights and measures is one which should come from the people. When the people of the country say to their Representatives in Congress that they want the decimal system of weights and measures, it will be established. That is the principle upon which our Government is founded. The Constitution gives to Congress the right to fix the standard of weights and measures. We have the two systems, equally legal, in this country. The use of the metric system is growing by leaps and bounds. We must sooner or later unify our weights and measures, just as every country has been obliged to take this step. The world must sooner or later unify its weights and measures. We may just as well face that. It is a matter that will not be downed. It is a thing that every citizen of the United States has a right to think about and to express his opinion upon; so let us be decent about it. There is no reason in the world why the propaganda against it should descend to the low scale of that attack. I have no words sufficient to express my contempt for that manner of carrying on propaganda.

There are some instances, especially when legislation is needed regarding laws or regulations, when organized effort by those acquainted with the needs is entirely proper. For example, there is one piece of legislation pending which gives to the Department of Commerce the power to regulate and pass upon the types of weighing and measuring devices. It seems to me that this is a very important function and one that should be exercised by the General

Government. I never could understand why any maker of the apparatus or any inspector of the apparatus or any user of the apparatus could object to legislation of that kind. It would result in great good in eliminating from the market many poor devices, and, what is far better, it would create a tremendous incentive to improve apparatus and to put better apparatus on the market. Too often people only see the preventive side, but that is insignificant when compared with the progressive side—the impetus that it would give to the production of good weighing and measuring devices. That is the way we ought to look at it.

This is a case where special legislation is required, and the principle involved is such that if you believe in it you ought to combine and go to Congress and ask its passage.

There are other matters of the same kind. When they are such as to require national legislation there is not only not the slightest objection, but, in fact, it is very desirable that this conference go on record in regard to it and take means to assist in its passage. For instance, consider the question of the sale of commodities by weight rather than by capacity. You are the people who are best posted in regard to that. You have studied it. Your daily work brings you in contact with it. If sales by weight are best, if that is one of the needed steps toward uniformity, you have a right to express yourselves in any way that you please, not only to your representatives but to the chairmen and members of committees and the people whose business it is to find out about these things.

There are two or three points about which I would like to speak in regard to the provisions for the bureau's work. We are now facing a very serious situation in the form of an enormous public debt, and Congress feels that it must cut down expenditures of the Government in every way possible. It must be decided what shall be done and what must be left undone. But there are always some things which it is inefficient to leave undone whether in Government work or in other lines of endeavor. As an example let us consider the farmer. He should not neglect to provide fertilizer for his soil. He may be very badly in debt; but the worse he is in debt, the more important it is that he increase his output. So with the Government. We are going to see in the next 10 years, perhaps, a period of very serious competition in all lines of industry. You would be surprised at the recent change in our imports. Even those countries recently devastated by war which must depend upon foreign trade to a very great extent have their agents all over the world now with a rehabilitation of their trade in view. So not only must we stimulate our whole production and increase our efficiency, but we must also look after our foreign trade.

Now, to my mind, the proper support of the work of the Bureau of Standards is perhaps as important a provision as Congress is called upon to make, and there are many Members of Congress who do fully realize the bureau's usefulness. The bureau has a splendid reputation with Congress. But there are many new Members of Congress to-day who do not really understand the nature of the bureau's work and its importance in the developing of our industries. To acquaint them with it is a process of education. The representatives of the people should satisfy themselves that the thing is needed, that

it is a good thing, before they appropriate money for it. I think our people too often forget in their criticisms of our legislative bodies the real nature of our Government and its institutions.

In regard to our own facilities for the coming year I regret to say that they will not be sufficient. We not only face the desire on the part of the representatives to economize, but we face another situation which, in this particular case, is harmful. The desire of the leaders in Congress, as far as possible, is to revert to the pre-war conditions. Now, there are some things that can go back to a pre-war basis; there are many other things that because of the war ought to be doubled or quadrupled. The war has brought about such conditions that there are reasons why the work of the bureau should be increased many-fold instead of cut down. So far as your particular branch is concerned, weights and measures, we will have just as much as we had last year. But in this work we should be building up. The whole question of weights and measures is growing at a tremendous rate. It is spreading all over the country. This is going to call for doubling the work by this department if we do what we ought to do by you.

Again, if we are going to take our proper place in the development of new materials and the building up and holding in this country of those industries which were established during the war, this calls for, and urgently calls for, a quadrupling of various facilities that we now have. If we can not afford it, it is well and good; but I tell you the time has come when Congress will have to consider what we are going to spend our money for and place it where it will do the most good. I think most of the members realize it at the present time. I think this country has the grandest opportunity that it ever had for establishing foreign trade. No country can exist as a great nation without foreign trade, because we must buy certain things from foreign countries. So, if we are going to buy things from South America, such as rubber, coffee, cocoa, etc., we must also provide for our sales to that country, since otherwise money will all pass in one direction.

Many of you are concerned in the manufacture of weighing and measuring devices. Many of you export or plan to export part of your product. The Bureau of Foreign and Domestic Commerce in the Department of Commerce is a bureau established especially to assist you along those lines. It maintains in the principal countries commercial attachés. Those commercial attachés are available to any industry that wishes to get into the foreign trade market. Several questions asked this morning suggested to me that the manufacturers of weights and measures are not familiar with this other agency of the Department of Commerce that can be used to great advantage. The bureau will take great pleasure in putting those of you who are concerned in the manufacturing of devices in touch with the officers of that department.

Now, I want to say again that we expect to learn from this conference as well as to teach. We learn quite as much from your experience as we can give to you. We can give you many scientific facts about weights and measures. You can give to us immense information in regard to your conceptions of the duties of weights and

measures inspectors and along other lines, so the benefits derived are mutual.

We are glad the delegates have the opportunity of getting to the bureau. While you are here we will ask you to go and see the laboratories and to inspect the exhibits. Above all, establish personal connections with Mr. Fischer and his staff and with others in the bureau, and see what is going on. We try to maintain here the latest and best devices of all kinds, and we also try to keep up to date with the laws and regulations. It is not an unusual thing for weights and measures officials to come to the bureau and to spend some time here, and every day brings us letters from State and city officials asking for suggestions along various lines.

This morning one State official, recently appointed, stepped up to me and acknowledged the great assistance that he has received in the past year through the weights and measures division. That is precisely the kind of thing we want to do. I wish to emphasize the fact that the bureau is here for your benefit and its usefulness will depend very largely upon how extensively you use its facilities.

I would like especially to have you look into the track scale work. We have certain equipments which are going about over the country. We need more legislation in regard to our powers in that case. Above all we need certain additional facilities. I will especially ask you to look into that work because it is one in which we feel that the bureau ought to be doing much more than is at present the case. Its very nature is such that we have to go to the public rather than to have the public come here. The officials in charge of that whole subject will be very glad to have you go into that as thoroughly as you like. We would like your cooperation in increasing that work and making it more useful.

In conclusion, I may say that Congress wants to feel that we are not providing for work that the States can properly do. You can see how important it is that we should agree on the functions of the State and of the Federal Government. If we pull together it is going to make the problem of getting adequate funds for the maintenance of weights and measures work a far simpler one.

Mr. Irvine. Mr. Chairman, in view of the attack on this department by this so-called institute—I am not familiar with the powers behind that throne—it seems to me that it would be only proper for us to extend to Dr. Stratton and the members of the bureau a vote of confidence.

The Chairman. The end of the meeting, I think, is the usual time for matters of that kind to be considered, and if it be taken up then it would be better.

Mr. Irvine. If it is taken up that way it will be all right.

The Chairman. I think the members ought to have a little more time to think about it.

REPORT OF THE SECRETARY, L. A. FISCHER, CHIEF, DIVISION OF WEIGHTS AND MEASURES, BUREAU OF STANDARDS.

Mr. Chairman, members of the conference, and guests, nothing serves to indicate the progress of the annual conference more than the lack of importance that the office of secretary of the organization has gradually assumed. At the early conferences all the arrangements for the conference, as well as the conduct of the conference,

fell upon the shoulders of the secretary and a few assistants. Now all the secretary has to do when the conference meets is to make a few remarks which serve to introduce him to the new members, and then fold his hands and let the meeting run itself. Even the work of preparing the program is much less laborious. In the early days the subjects that could be discussed were limited. Many of the delegates were new and unfamiliar with the problems with which they had to contend. The elementary features of the subject were what they needed and got at these conferences. Then, as soon as they got their States organized they promptly had a conference or annual meeting of their own.

Conditions are entirely different now. We now have a large number of men who can discuss any phase of the subject of weights and measures. The consideration of intricate technical questions no longer bothers this or any State conference, and, to take care of the legal side, we have developed the finest lot of lawyers outside of the legal profession. And throughout our whole movement, the spirit of cooperation has been predominant. Without that these conferences would not have been possible. Your attendance here is entirely voluntary; no State or national law requires you to come, nor do your regular duties require your attendance. Your object in coming is not a selfish one, but it is due to a desire to meet with men engaged in the same important public service with the expectation that you will be better fitted for the performance of your duties when you go back.

May I be permitted to claim the same thing for the Bureau of Standards. The work in connection with the conference and our cooperative work with the States are carried on with funds which can ill be spared from other projects. The Bureau has not acquired a single dollar nor added one iota to its authority by reason of this phase of its activity.

When the Bureau of Standards was established, it was confronted with the situation of a country which provided little or no protection to its citizens from the practice of false weights and measures, certain to exist if systematic inspection by the Government is not carried on. The Constitution of the United States gives Congress the authority to fix the standard of weights and measures, and under this provision the Bureau might easily have attempted to build up a vast Federal organization to handle the situation. The fact that we preferred to build up State organizations should free the Bureau from any charge of selfishness or effort to dominate the situation. Except for the supreme satisfaction that one derives from working for the public welfare, no member of the Bureau has been the gainer for the 15 years of effort put on this work. There were and are many fields of work which promise better rewards. If it were not for this great satisfaction, which I believe we all feel, very few of you gentlemen would be coming here year after year. It is the feeling that we are performing a useful public service that keeps us at it.

As usual, every effort was made by your chairman and secretary to arouse interest and secure the attendance of delegates to this conference. Early in April letters urging that delegates be sent to the conference were sent to the governors of the States, to the State weights and measures officials, to the city and county sealers, and to the proper authorities of all such cities and counties as well as to

the authorities of cities and counties which are permitted or required by law to have sealers, but which have not acted under this authority. In addition to these letters of invitation, a great many follow-up letters were written, and acknowledgments made of communications from persons signifying their intention to be present; hotel rates were gathered and forwarded to the delegates for their convenience in selecting hotel accommodations; the advance report of the Committee on Specifications and Tolerances was sent out and later the final report; and manufacturers were invited to be present, and considerable correspondence was had in connection with the exhibits. A fair estimate of the number of letters of all kinds sent out would be about 4,500.

A word now as to the work of the bureau in the field of weights and measures during the past year.

During the past year a great deal of time has been devoted to the subject of specifications for liquid-measuring devices by Mr. Holbrook, who, as chairman of the Committee on Specifications and Tolerances of the conference, will bring up the subject for general discussion at the proper time. This is one of the most important questions now before weights and measures officials owing to the new types of measuring devices now being put upon the market. It is highly important that this conference agree on tolerances and specifications before we adjourn. There are many questions involved in the subject; but, if the conference goes about it in the right way, we should come to an agreement. We have with us the members of the committee who have given this matter a great deal of thought, the manufacturers who know the subject thoroughly from their angle, and the weights and measures officials who are thoroughly familiar with the performance of the various devices in the field. This combination should certainly be able to come to a conclusion.

Satisfactory progress has been made in bringing up to date the compilation of State and National laws on weights and measures published about eight years ago. Mr. Parry has devoted a large amount of time to the searching. In view of the large number of changes and additions which have been made since the last edition was issued, a revision would have been justified some two or three years ago, but on account of our entrance into the war it was not expedient to undertake the preparation of such a publication, nor was opportunity found to do so until last summer. The compilation will include the session laws of 1919, which, of course, will not be available for a few months for all the States having sessions. It is hoped that no serious delay will be encountered in getting the volume published so that it may be available for distribution as early as possible.

The mine and track scale work has been continued along the same lines followed in former years, except that due to the increased cost of material and labor our funds proved to be insufficient, and it was necessary to suspend operations in both fields part of the time. This is a very inefficient method of carrying on the work, and in order to avoid its recurrence and to increase the quantity and efficiency of the work an increase in these funds for next year will be asked for.

That, gentlemen, is all that I have to say.

REPORTS OF STATE DELEGATES.[1]

CALIFORNIA.

By Charles G. Johnson, *State Superintendent of Weights and Measures.*

Mr. Chairman and gentlemen, the service in the State of California to-day is better perhaps than it has ever been. That is entirely due to the interest which the county and city sealers take in their work. I aim to make them just as important in their activities as is possible—to depend upon them entirely for the efficient and proper enforcement of all the laws. I feel and place that confidence in the sealers because I find a great many of them are just as well informed upon the weights and measures problems as I am myself and, in many cases, perhaps, much better. In that manner we have a uniform condition of general efficiency throughout the State. As an illustration of the interest shown by the officials in their work, I might mention a man who devoted all of 17 days to studying the laws and regulations.

In accomplishing the enactment of such regulations and amendments as we deem advisable we charge each one of the sealers in the counties with the duty of bringing to the attention of the person elected to the legislature the work of the department, and of familiarizing him with it, so that when he goes to Sacramento as a legislator he will have an understanding of the purpose of the department and know something of the importance and the value of the service rendered by it. We find in California that while they elect good men to the legislature many of them know nothing, or perhaps next to nothing, about weights and measures. Therefore the necessity for the employment of means to educate them is great. In that way we have had the cooperation of the legislature and have obtained the necessary powers with which to accomplish the things which we think ought to be done.

I may say a few words about some of our testing equipment. We realized some time ago the fallacy of endeavoring to make an inspection of a 10, 15, or 20 ton scale with a small amount of test weights. We therefore developed what is known as the automobile testing truck. Each of these motor trucks carries 4 tons of test weights, which are moved by convenient apparatus which does not necessitate the handling by the sealer of each individual piece.

We also have a State truck similarly equipped and we use about 4 tons of standards and also the heavy truck itself in the added load tests. In that manner we are able to determine the accuracy and the correctness of the many large wagon scales that are constantly employed in the weighing of bulky and heavy commodities. We have 1,700 public weighmasters, all bonded, throughout the State. We give their scales particular attention with the heavy apparatus. In that manner we can weigh with a greater degree of accuracy.

We have relegated from use in California the old system of dry measure. We do not have that at all any more. We find that the system undoubtedly originated in some pioneer period before the

[1] For convenience of reference these reports have been arranged in alphabetical orde throughout.

modern came in. It was easy for a farmer or merchant to build a peck or bushel measure. We believe in California that the employment of weights obviates the employment of that system entirely. There is nothing measured by the dry measurement in the State. We find it so much more convenient; we find it so much more practical. I find that oftentimes commodities are shipped into the State marked on the containers as being "One bushel." We will have to go back to the records of the State from which that commodity came to be sure to know what the bushel meant. As you know, the bushel is different in different States. A bushel of rye or a bushel of oats has a different weight equivalent in the several States. As I said before, we confine ourselves entirely to the determination of quantity in net avoirdupois weight in the sale of dry commodities in the State. We do not recognize the gross weight. We do not know what the gross weight is there any more.

There is a great deal to be said on what we are doing. I do not want to take up a lot of unnecessary time, but, on the other hand, I want to avail myself of this opportunity to say that the California department reflects the knowledge and the wisdom that we obtained by attending these conferences and our constant association with the Bureau of Standards. It was through the activities of the bureau that the department was established, and we have always felt that the bureau was largely responsible for the progress of the department. There are comparatively few problems which we meet which are not taken up with the bureau for solution. I find that it is a most wonderful safeguard against the commitment of error.

We have a file of clippings in our office covering a period of about seven years, and I believe there are something like 18 very voluminous volumes. In the entire collection there is not one article which criticizes the department or reflects on its usefulness. I credit a great deal of the success of the department to my close association with the Bureau of Standards.

The CHAIRMAN. At the bureau we are particularly interested in California, because it is one of the States that started out with a clean slate, as it were, and the relations between that State and others, with the bureau, is just about what was planned in the first place; that is to say, the State was not hampered by obsolete laws and so could start fresh, and they have cooperated with the bureau in every way possible.

I note with interest that Mr. Johnson's problems are not greatly different from our own. His statements in regard to the legislators apply equally well to our legislators. In other words, there is always a large amount of educational work to be done. The whole subject is a new subject, and the education of those who have such matters in charge as to the particular reason for or need of legislation and the kind of legislation required is very important.

You would be surprised as to the extent of the service which the Bureau of Standards renders Congress in an advisory capacity. There is hardly a law passed that does not involve some kind of measurement or some kind of standard. Often these are well known, but, again, very often questions concerning them are presented to the bureau. State laws, as well as national laws, are full of defini-

tions and regulations which are based on unscientific principles. They really can not be carried out in many cases as a result. However, there is more and more tendency on the part of the legislators, both in the States and the General Government, to get the advice of experts when framing laws or regulations.

CONNECTICUT.

By THOMAS EGAN, *State Superintendent of Weights and Measures.*

Mr. Chairman and fellow delegates, first, I want to say that I feel obliged to acknowledge the value to our weights and measures officials in Connecticut of these annual conferences and of the Bureau of Standards. We feel that the Bureau of Standards and the annual conferences are the rocks upon which are founded our activities in weights and measures work. I have prepared a report which includes a mention of some of our activities. I do not care about reciting them for the purpose of parading our work, but it occurred to me that it would be well to make known to the members of the conference what we were doing—what activities we are engaged in—since, possibly, some ideas of value may thus originate. Inasmuch as I come to learn and find out things of value in our work, possibly it might be at least interesting to other delegates to hear what I have to say.

The problems of sealers of weights and measures in Connecticut are somewhat different from those encountered by sealers in other States that have the so-called "model law" as the basis of their powers and duties.

We in Connecticut have gone through all of the primary work with a fair degree of success and have relegated to the scrap heap a great quantity of defective instruments; have made the sale of heavy wooden containers and wrappers at food prices unpopular; have converted the manufacturers of print butter to the proposition of 16 ounces to the pound; and have given the gasoline and coal dealers such attention that it has made many of them sit down and figure out as to whether or not it paid to be crooked or negligent in the conduct of their business.

The credit for such corrections as we have been able to make by authority of the weights and measures law does not belong entirely to our department, as we have had assistance and support from the prosecuting officials and the courts. The work of county, city, and town sealers has also been of benefit to the consumers.

There is, I believe, some difference between our service and methods and that of weights and measures officials in other States, in this—that with us weights and measures work is a branch of the State Police Department's activities. This department was established to engage in the investigation of crime and to assist the prosecuting authorities in the enforcement of criminal laws, so our inspectors are selected from members of our force who have been engaged in investigating other criminal matters—their duties being in the weights and measures work to detect violators of the law, secure evidence, and have the same presented to the prosecutor with a view to bringing about the correction of all such offenses in the courts.

Merchants using weighing and measuring instruments have certain specific duties to the public at large, one of which is to conduct their weighing and measuring in a careful manner and with care as to the instruments used or the persons employed. If through his negligence the people with whom he deals are deprived of value, he ought to be dealt with by the local court in such a manner as will correct his attitude toward the public.

The matter of gasoline pumps has taken up considerable time in prior conferences and is in line for further attention at this session. We have in our State about all of the kinds that are common anywhere and we find them, particularly the later models, of good design and capable of giving good service. The difference in their performance is largely due to the manner in which they are maintained and kept. They have the common fault of eventually getting out of proper adjustment or in need of new parts.

Our courts have held, in cases tried before a judge and jury, that a man selling gasoline short measure from a defective pump is liable to prosecution regardless as to whether or not he knew the pump was defective or that it gave short measure—that a man using a concealed measure in selling his commodity must exercise caution in keeping such concealed measure accurate. In one case we had received numerous complaints of short measure, and I desire to bring this case to the attention of this conference because of the attitude of certain representatives of pump companies.

May 2, 1916, a dealer in gasoline, using an automatic measuring pump, sold to State inspectors 5 gallons of gasoline, which was remeasured and found to be in fact only 4 gallons and 2 quarts The inspectors thereupon tested the pump and found on two separate tests that the pump delivered only $4\frac{1}{2}$ gallons where it should have delivered 5 gallons. The man was brought before the local court and found guilty for selling short measure and thereupon took an appeal to the higher court, and on May 8 and 9, 1918, the case was tried by a judge and jury. The defendant in this case introduced pump experts, so called, who claimed that this shortage might have come about without any knowledge on the part of the defendant—that all pumps were subject to wear, particularly the leather used on the pistons, and also that if a grain of sand lodged in the foot valve it would cause a leakage. The defense, however, neglected to show that the defendant had taken any action to verify the accuracy of this pump, and the judge, in charging the jury, commented upon this fact and pointed out that, inasmuch as the defendant was selling gasoline by a process of measurement that did not permit the purchaser to see for himself as to whether or not the measuring device was in good order, the defendant should have taken special precaution to test his measuring device and insure its being accurate at all times. A verdict of guilty was returned by the jury in that case and also in another case where a similar defense was made.

In June, 1919, we equipped an automobile with an auxiliary gasoline tank for the purpose of making inspections of quantities of gasoline sold through the use of pumps. The inspectors usually ordered and paid for 5 gallons delivered into this gas tank, which was at the rear of the car. In all cases the operator of the pump was given an opportunity to deliver the gasoline in the ordinary

manner, and in each case after the sale and delivery our inspectors made a personal test of the measuring qualities of the pump in use. During the summer 156 purchases of 5 gallons each were made in this manner with the following results:

In 80 purchases the quantities received were found to be within the limits of the established tolerance.

In 50 purchases the quantities received were short beyond the tolerance, but less than 1 quart short.

In 22 of the purchases the quantity was short by more than 1 quart.

These last 22 cases were taken up with the local prosecutor, with the result that 20 dealers were convicted of violation of the weights and measures law. Of the 156 inspections made, only 4 were found where the pumps gave overmeasure.

With regard to the sale of coal, our inspectors made inspections in one city in April, 1920; loads of coal in the process of delivery were stopped and reweighed, with the following results:

	Per cent.
Number of inspections, 12	100
Correct weight, 3	25
Overweight, 2	16⅔
Short weight, less than 2½ per cent, 2	16⅔
Short weight, more than 2½ per cent, 5	41⅔

Cases referred to the prosecutor, 5.

In those five loads of coal there was a shortage of 575 pounds.

In looking forward there are several matters of importance to which this organization can afford to give time and thought. One that appeals to me strongly is the further standardization of containers of all classes. The article submitted at the last session by Mr. Downing, of the Bureau of Markets, shows a move in the right direction which should be encouraged by all sealers. Why not go even further and perfect the standardization of canned goods? Why have several sizes of cans of tomatoes, etc.? First find out what are the best sizes for economical production and consumption and make them the units of trade; have these units fixed as to quantity and let the trade adjustments of quality and conditions of sale be cared for in the making of the price.

The Chairman. We will later be given an opportunity for discussion of these points, and especially we hope to hear from city and county delegates. The representative from Connecticut has mentioned one very important point at the beginning of his talk, and that is the law under which he must operate. It seems to me that one of the best things that can come from this conference is the discussion of points of that kind. If the representative from Connecticut finds it desirable to initiate new legislation in the State, it is not at all unlikely that his recommendations will have far greater weight if he can go to his State legislature with the statement that this conference recommends certain procedure, or that other States have certain laws, or that such and such a practice is no longer being continued. As I mentioned before in regard to our own affairs, Congress is very apt to consider the thing as a personal matter; that is, when a small committee deals with one representative of the particular bureau concerned, they think it is more or less a personal matter. The same is true in your State legislature. If you can go

to the proper authorities armed with the recommendations of this conference and the practice of other States, which you can find out about here, it is going to put the thing on an entirely different basis.

The time for our luncheon has now arrived. This afternoon we will continue with these reports of State delegates. If there are no announcements that should be made at this time, the meeting will stand adjourned until the time scheduled for the session this afternoon.

(Thereupon, at 12.35 o'clock p. m., the conference took a recess until 2 o'clock p. m.)

SECOND SESSION (AFTERNOON OF MONDAY, MAY 24, 1920).

The conference reassembled at 2.30 o'clock p. m., Dr. S. W. Stratton, chairman, presiding.

The CHAIRMAN. The meeting will please come to order.

Just before lunch we listened to very good reports from the representatives from California and Connecticut. There are several others here from those States and I think that some time during the meeting we can provide time for the discussion of those matters which particularly pertain to the city and county officials.

At this time we will expect to hear reports from the delegates from the various States. In case no official representative from a State is present, then we would like to have some one from the State delegation report.

REPORTS OF STATE DELEGATES—Continued.

DISTRICT OF COLUMBIA.[2]

By GEORGE M. ROBERTS, *Superintendent of Weights, Measures, and Markets.*

Mr. Chairman, the District of Columbia, like some of the States, has a weights and measures law that is not adequate for the protection of the public in some respects, and on that account it has not been possible for me to do here what I should have been pleased to have done. I have been endeavoring for two or three years to procure the passage of an entirely new weights and measures law for the District of Columbia, but as is well known, we have no local legislative body, and all the laws for the District of Columbia have to be passed by Congress. As Congress usually has so many matters of large importance before it, there is often some difficulty in getting prompt action on purely local measures. I am pleased to state, however, that a bill prepared by myself has now passed the House of Representatives, and I have just learned, since coming out here this morning, that the District Committee of the Senate has decided upon a favorable report on the bill. I hope that the Senate will take it up in a short time and push it to final passage. I feel that it will do so as early as possible.

Some of the provisions of this bill, which are not now covered by statute, are as follows:

1. Prohibits short numerical count where commodities are sold by count.
2. Provides specifically that commodities sold by weight shall be sold by net weight.
3. Establishes a standard loaf of bread in the District of Columbia.
4. Provides for the sale of ice by weight only.

[2] This report was given later in the session when Mr. Charles G. Johnson, vice president, was in the chair.

5. Establishes standard containers for fruits and vegetables, and provides that when such commodities are sold otherwise than in standard containers they shall be sold by weight or count.

6. Regulates the sale of coal in small as well as large quantities.

7. Regulates and safeguards the use of gasoline-measuring pumps more rigidly than at present.

8. Regulates the use of coin-in-the-slot machines and other similar automatic vending and weighing devices.

9. Requires the dealer to deliver a sales ticket when demanded by the purchaser of a commodity, and provides that such sales ticket shall state the name and address of the dealer, and the correct weight, measure, or count of the commodity sold.

10. Prohibits taking of overweight by a purchaser when permitted by the seller to ascertain the weight of the commodity being sold.

11. Abolishes the indefensible system of collecting fees for testing weighing or measuring devices in the District of Columbia.

12. Provides for the establishment of specifications for weighing and measuring devices that may be used in the District of Columbia.

In preparing this bill, I consulted the statutes of many States and the ordinances of many cities, as well as the "model law" prepared by the Bureau of Standards, all of which I found of much value, as it is not such an easy matter as one might think to sit down and write a complete bill of this kind without profiting by the experience and wisdom of others. When the bill is finally passed, I believe that the District of Columbia will have as good a weights and measures law as can be found almost anywhere.

The Acting Chairman. Mr. Roberts, I believe the conference has the privilege of expecting from you the best weights and measures law in the United States. It ought to be done here in this model district of yours.

Mr. Roberts. I will say this, Mr. Chairman, that, of course, I do not claim that this bill that is now pending in Congress can not be improved. I feel sure that some of the gentlemen might get hold of the bill and improve it very much, but I conferred freely with the committee in preparing the bill, I consulted the State statutes of nearly every State in the Union, including California, I consulted also the weights and measures ordinances of most of the large cities in the Union, and I also consulted the model law prepared by the Bureau of Standards. In assisting the committee in working out the bill we tried to take the best features that we found in all of those laws.

The Acting Chairman. The construction and the operation of your law in this particular district should be one of the exhibits for the benefit of the rest of the members.

A Delegate. Do you permit the use of dry measure in the District of Columbia?

Mr. Roberts. Yes; we are obliged to permit them under the law. I may say further about the law that we have in the District of Columbia—a dry measure has been prescribed by the act of Congress that does not conform with the dry measure recommended by the Bureau of Standards. The result is that when persons buy in dry measures authorized by law in the District of Columbia they often receive a smaller amount than they would receive if we were using

the measure recommended by the Bureau of Standards. I am sorry to say that, but I am powerless to help it because Congress fixed the law.

A DELEGATE. Get Congress to change the law.

Mr. ROBERTS. However, I am not censuring Congress for what it did. That law was passed many years ago, and at that time it was considered a good law.

ILLINOIS.

By WILLIAM F. CLUETT, *Chief Deputy Inspector of Weights and Measures of Chicago.*

Mr. President, delegates, and guests, last year, when I had the honor to report for the State of Illinois, I said that I was glad to be able to say that the State of Illinois was about to take her proper place with her sister States who had good and comprehensive State weights and measures laws, and departments properly equipped and manned to enforce those laws and protect their citizens. These remarks were based upon the fact that a State weights and measures law had been drafted at the request of Mr. James F. Baldwin, the assistant director of the department of trade and commerce, under whose immediate supervision the superintendent of standards came; that this law was patterned after the provisions contained in the model law passed and indorsed by these conferences, and because of the backing the bill had it stood a very good chance of being passed.

This bill passed the senate without amendment and was reported by the committee in the house with a recommendation to the house that it do pass, also without amendment, and we began to feel easy about it.

I regret to report that after getting to the house the packing interests had five amendments introduced to the bill. Two of these were of no moment, but the other three we strenuously objected to.

One of these amendments deleted from the section defining articles in "package form" the words "or in paper wrappers or coverings of any kind," and the same words were deleted in the penalty section. The last amendment, however, was the one we feared the most. Had they succeeded in having this included it would have permitted any dealer to sell by gross weight by putting up articles in advance of sale and simply printing on his bill heads or cash sale slips the information that articles put up in this manner were so sold. Thus the public would have been mulcted out of hundreds of thousands of dollars annually. As we were not informed of these amendments until the last day of the session, when the bill was up for passage, and we had had no opportunity to talk to any of the representatives against them, we did the only thing left, which was to have the entire bill killed. This leaves the State of Illinois in exactly the same position as before the introduction of the bill.

The present State law provides for a superintendent of standards in the department of trade and commerce who shall have the custody of the standards of the State. It specifies what the standards of length, surface, weight, and capacity shall be. It fixes a statutory weight per bushel for about 75 fruits and vegetables; provides

a penalty for taking any greater number of pounds when buying or giving a less number of pounds when selling any of the enumerated articles; provides a section relating to the sale of firewood, and specifies 128 cubic feet as a cord of wood. It provides that the State sealer shall try and prove the standards of weights and measures belonging to any city, county, or other municipal corporation at least once in each five years, where the provisions of the act require that a sealer shall be appointed. It provides that the State standards shall be kept in good order and in a safe and suitable place and that they shall be submitted at least once in 10 years to the National Bureau of Standards for certification. It provides that the county clerk of each county shall be the sealer of weights and measures, and that he shall procure, at the expense of the county, a full set of standard weights, measures, etc., which shall be tried and proved by the department of trade and commerce. It provides a schedule of fees that may be charged for inspections. It provides that the sealer shall have the authority to seize and hold for use as evidence in any suit brought under the statutes of the State or any ordinance or by-law of a municipal corporation any short weight or measure, or faulty or incorrect weight, scale, or weighing or measuring device, or any commodity or article of merchandise sold, offered, or exposed for sale which is of less weight or measure than it is represented to be. It further provides that any such sealer or inspector of weights and measures shall not be liable to the owner of the property seized for damages caused by such seizure in any case where in fact any such measure is short, or any weight, scale, or weighing or measuring device is faulty or incorrect, or any commodity or article of merchandise is of less weight or measure than it is represented, or reasonable grounds exist for believing it or them so to be.

It provides further that the department of trade and commerce shall inspect and test at least once annually all of the weights, scales, and measures in use in every institution under State control and authorizes the department of trade and commerce to inspect all automatic or mechanical pumps or devices used for the purpose of measuring liquids to be sold or offered for sale in places where there is no local inspector.

The superintendent of standards, Mr. Robert F. Adams, reports that, under the provisions of the act, he has inspected the scales and measures at each of the 24 State institutions, and five normal schools and the State university, and submitted detailed reports of the results of these tests to the directors in charge of such institutions. Accompanied by an inspector of weights and measures he has visited 117 towns and cities and tested 432 gasoline pumps—condemning but two of the entire number. He found that the inaccuracies of the pumps tested were largely due to carelessness of the operators rather than intent to defraud. He called the specific provision requiring the owner or user of each pump to test it each day, before using it, to their attention.

Mr. Adams reports that during the past year more complaints than usual have come to his office regarding unsatisfactory conditions of weights and measures in certain localities of the State. The attention of the complainants has been invariably called to the inadequacy of

the present law and, with the present high cost of living bearing down upon the citizens, the officers of the department of trade and commerce are more than ever convinced there is necessity for a complete revision of the present law.

It is confidently believed that the experiences of the State during the interim between the last session and the next one, will fully justify the presentation to the next legislature of a bill similar to Senate bill 383, which was defeated, and it is expected that there will be such a demand from localities all over the State for the enactment of such a bill into law as to make its passage irresistible, and thereupon, in this respect, Illinois will take its proper place among the States. I thank you.

The CHAIRMAN. Mr. Cluett has given us another very useful illustration of the value that can come from this conference. The report of such facts as these will not only serve to warn other people in the different States, but it will also serve to educate the people. I am inclined to think that many of these amendments and much of the opposition that we find to the weights and measures movement, come through too great conservatism. When the pure-food law was put through we had all sorts of opposition that now appears to have been ridiculous, and to many they appeared to be ridiculous at the time. When the net-weight amendment was put through the same thing occurred, and you are going to have the same thing to contend with in cases of this kind. It is not necessarily true that these people are willfully and maliciously doing this to defraud the public, but you are breaking down a custom, and that always meets opposition. If we can educate the other side, and if we can show that it is a right thing, the opposition is sure to break down. I do not know whether it is wise for us to try to help. We do not want to meddle in local affairs but if Mr. Cluett and his associates could go to the governor and the officials and state that it is the opinion of this conference that certain matters ought to be handled in certain ways, then the case would be strengthened.

MASSACHUSETTS.

By FRANCIS MEREDITH, *Director, Division of Standards.*

Mr. Chairman and gentlemen of the conference, the Commonwealth of Massachusetts shortly after the last meeting of this conference, in the interest of greater efficiency and economy, consolidated and coordinated some 118 departments into 20, of which the department of labor and industries is one; and in that department of labor and industries is the division of standards. The chief of that department was termed a director, and about four months ago I was appointed to that position, so that you may readily see that this is not only my first appearance at these conferences but that I also appear absolutely as a novice. My vocation of the past has not been in the line of weights and measures or standards. I think the State is fairly well represented here to-day, however, because there are a large number of local sealers present.

The following summary of legislation enacted at the present session of the Massachusetts Legislature may be of interest to members of this conference:

Chapter 45. Relative to Sealing of Milk Bottles or Jars.

The former statute authorized the sealing as measures of milk bottles or jars having capacities (within certain tolerances) of one-half pint, 1 pint, 1 quart, 3 pints, or 2 quarts. The amended law extends this provision to bottles or jars having a capacity of 1 gill and permits the marking of a definite filling point other than the level of the bottom of the cap or stopple. The latter provision is designed to facilitate the delivery of full measure when milk is pasteurized in the bottle in which it is delivered.

Chapter 259. Regulating the Use of Containers for the Sale of Ice Cream.

This act provides that all cans, molds, or other containers used in the sale of ice cream shall be of the capacity of standard liquid measures, and that they shall be sealed by a sealer of weights and measures, or by the manufacturer under authority granted him by the director of standards. When a container has once been sealed it shall not be necessary to have it sealed again as long as it remains in its original condition but sealers are required to make semiannual inspection of such containers. Paper or fiber cartons, or other similar containers used in the sale of ice cream by measure must contain, and be sold as containing, 1 quart, 1 pint, one-half pint, or 1 gill. The shape and dimensions of these containers must be approved by the director of standards, who may authorize the manufacturer to print thereon a statement of capacity with the words "Approved by the Director of Standards for Massachusetts." The director may at any time, for due cause, revoke the authority granted by him and a fine not exceeding $50 is the penalty provided for violating any provision of the act or for marking any container without authority.

Chapter 325. Providing for the Appoval of the Director of Standards of Types of Slot Machines and Other Automatic Devices.

This act authorizes the director of standards to approve types of slot weighing machines or other automatic devices which, upon deposit therein of a coin or other article of value, furnishes music or other entertainment, exhibits pictures or supplies any merchandise or other thing. Whoever installs or maintains such a machine or device of a type which has not been so approved shall be subject to a fine of not more than $25 if such machine or device fails to respond to the insertion of a coin therein.

Chapter 350. An Act Relating to the Survey of Lumber.

In the recent consolidation of departments the duties of the former surveyor general of lumber were assigned to the director of standards. Under the old law the surveyor general and his deputies were compensated by fees collected from the persons for whom surveys were made. Under the new law surveyors shall be paid by the Commonwealth and all fees collected shall revert to the treasury. The director of standards, with the approval of the commissioner of labor and industries, is empowered to establish and define grades and kinds of lumber and to establish fees for the survey and measurement

thereof. As the manufacturers of red cedar shingles have recently established the "square" unit of measurements for the sale of their products, the existing law penalizing the sale of shingles in other than the "thousand" unit is repealed and the director of standards, with the approval of the commissioner, is authorized to establish units of measurement to be observed in the sale of wooden shingles.

CHAPTER 369. AN ACT RELATIVE TO THE TESTING OF CERTAIN WEIGHTS, MEASURES, INSTRUMENTS, AND MECHANICAL DEVICES.

This act authorizes the director of standards to assist manufacturers in establishing and maintaining the quality of their products by determining the accuracy of their weights, measures, or other instruments or mechanical devices of any kind used in standardizing the production of manufactured articles, in determining wages or compensation for labor performed, in determining the dimensions of any tank, can, or other container, or in determining the accuracy of any automatic weighing or measuring device. Nothing in this act is to be construed to give the director or his inspectors the power to seal any of the devices which are now required by law to be sealed by the local sealers of weights and measures. Any device tested and found correct by the director may be sealed by him. If he finds it inaccurate, he may, in his discretion, either condemn it or he may furnish the owner or user with a certificate indicating the amount and direction of any errors found by him.

CHAPTER 418. AN ACT TO REGULATE BAKERIES AND BAKERY PRODUCTS.

This act relates principally to the sanitary condition of bakeries and of containers and vehicles used in the distribution of bakery products. The sanitary provisions follow closely those of a similar statute enacted in Indiana last year. In addition, it repeals the law relative to weight of loaves which has been in effect since 1859 and which has been practically impossible of enforcement under present conditions. The new law establishes the standard weight of loaves of bread in units of 16 or 24 ounces or multiples of 1 pound. These weights are to be construed to mean net weight 12 hours after baking, to be determined by the average weight of at least 12 loaves. Loaves, other than the standard weights specified, must be plainly marked with the weight of the loaf and the name of the manufacturer. If wrapped, the information must appear on the wrapper; if unwrapped, it must be stated by means of a pan impression or by means of a label affixed to the loaf. The director of standards is required to prescribe rules and regulations, including tolerances within which the weight of loaves shall be kept.

This occasion, Mr. Chairman, is one from which I hope to derive much benefit. I expect and hope that it will be my privilege to be here again when I shall be more conversant with the doings of this conference.

The CHAIRMAN. Massachusetts has always taken the lead in weights and measures. When we started out I think there were two weights and measures officials at the conference, and one of them was from Massachusetts.

MICHIGAN.

By A. A. Greer, *Chief Inspector of Weights and Measures.*

Prior to the year 1913 such weights and measures legislation as existed in the State of Michigan was crude, inoperative, and in no way enforced. In that year the legislature gave us the first real weights and measures laws that the State has had. The act made the then State dairy and food commissioner, State superintendent of weights and measures, his deputy, deputy superintendent, and all of his inspectors became ex officio State inspectors and sealers of weights and measures.

The law, being the first attempt at remedying conditions which had become deplorable in the State, was by no means perfect, and it yet remains for the legislature to here and there amend it so as to make it what it should be. One serious defect was the entire absence of any specific appropriation for enforcement. The State superintendent of weights and measures had, and still has, his regular appropriation for the enforcement of food laws, the enforcement of the State's prohibitory law, and other laws the enforcement of which is charged to him, and on this appropriation he must draw for such amount as he expends in weights and measures inspection. With the advent of the State prohibitory law its enforcement was from the beginning a vast undertaking, and this necessarily impaired, for the time being, the efficiency of weights and measures inspection.

We have, however, devoted a large amount of time and given careful consideration to the inspection of weights of food in package form. Michigan's law, as well as the national law, requires that all food in package form shall have the net contents of the container stamped thereon. The department has managed to take care of this feature of weights in no uncertain manner. It is the duty of every inspector connected with the department to be on the alert for possible shortages, and when such shortages are found, samples are taken and sent to our laboratories and the matter taken up with the manufacturers. I can safely say that in none of our States has this work received more careful or accurate attention than it has in Michigan.

It is incumbent upon the department to test the weights and measures of the various State institutions at certain intervals and this work has received our attention. We are further required by law during the fruit season to enforce the provisions of the fruit laws in so far as they are affected by weights or measures, and for this purpose, an inspector is, during the fruit season, kept continuously busy in that line of work.

We are charged with the examination of all milk test bottles and seeing to it that same are kept fully up to standard. That the intent and purpose of this act may be carried into effect, each bottle must be examined, and since Michigan ranks well as a dairy State and has a great many creameries, cheese factories, condenseries, milk stations, etc., using these bottles, one person is kept continuously busy in such examination.

The work that the department feels that it could well enlarge upon, and intends to enlarge upon in the future, is the physical examination in the field of large scales, wagon scales, and scales used in the

transaction of business. Also more attention than we have been able to give should be given to the various kinds of measures used in commerce.

The law provides, it is true, and it seemed to have been the intent of the legislature when the law was passed, that every county and municipality in the State, or a county with a city therein, or a county joining with a city therein, should appoint a local sealer of weights and measures who would act in cooperation with and under the supervision of the State department. The law is advisory instead of mandatory in nature, and unfortunately a number of our boards of supervisors whose duty it would be to make such appointment, have failed to appoint. In counties and cities where the spirit and evident intent of the law is carried into effect and a live, up-to-date man appointed, the remedial effect has become at once apparent.

The department will suggest and endeavor to bring about at the next session of the legislature an amendment to the act, making it compulsory on appointing boards to provide local sealers. We have to-day 39 local sealers when we should have at least 83, and which we will have if we can have the law amended so as to make these appointments compulsory.

In the larger cities like Detroit, Grand Rapids, Battle Creek, Saginaw, Lansing, and Jackson, the State is exceedingly fortunate in having efficient and up-to-date men on the job, men whose hearts are in their work, and the nature of the work is such that it relieves from the shoulders of the State department the responsibility in these particular localities. With a man in every county doing like work, assisted and cooperated with by the State department, we expect to place Michigan in the foremost ranks in so far as honest weights and measures are concerned.

MINNESOTA.

By Charles C. Neale, *State Commissioner of Weights and Measures.*

Mr. Chairman, inasmuch as Minnesota is placed on the regular program, I refrain from making any remarks about the work in the State, except to say that Minnesota is represented to-day by two individuals, Mr. J. R. Methven, inspector of the State scale department, and myself; and I will further say that it has been Minnesota's privilege since 1909 to be represented at these conferences. I personally have missed but one, and always feel that I will never miss another. I thank you.

NEBRASKA.

By Leo Stuhr, *Secretary of Agriculture.*

Mr. Chairman, in Nebraska the weight and measure work is under the civil administrative code and is a division under the bureau of marketing. This piece of legislation, which was passed by the last session of the legislature, has been operative since August of last year. The work is well organized and the State is divided into districts, an inspector having charge of each district. The new legislation which was passed at that session added new sections to the

weight and measure law, which include the licensing of slot weighing machines, and also provide that all coal and coke be sold by weight instead of by the basket, which method was formerly practiced to some extent. Another provision is that Nebraska recognizes only weight or numerical count; it does not recognize dry measures or containers of that kind.

I do not have much to say at this time, with the exception that there are two or three things which have been giving us trouble in Nebraska which I think it would be wise to have taken up, since you are undoubtedly interested in the same things. One of them is gasoline-measuring pumps. I think the conference should adopt something which would serve as a guide for carrying on this work in the various States. In Nebraska the inspectors seal pumps, but it is a matter of but a short time until they will be out of adjustment again. The inspectors are instructing the filling-station operator to provide a 1-gallon or 5-gallon standard measure, which they are to use in checking up their pumps from time to time. It is about the only way we have whereby the operator can himself know that his measuring pump is measuring correctly.

Another subject which I think should be considered by this conference is the standardization of weights for small packages. You undoubtedly know that during the war the tendency was to place on the market slack-filled packages. The tendency was to keep the size of the package the same as formerly, but fail to fill it. There is no standardization. We find some packages marked in drams and others in odd fractions, such as five-eighths ounce. It seems that if these could be standardized it would be much more satisfactory than having every size package imaginable.

Once again I would emphasize that the question of measuring pumps should receive very careful consideration. It is one thing which has been causing a great deal of trouble, and the inspection work has been very unsatisfactory owing to the fact that these devices are so subject to getting out of order. I thank you.

NEW HAMPSHIRE.

By H. A. Webster, *State Commissioner of Weights and Measures.*

Mr. Chairman and gentlemen, this is the second time that I have had the privilege of attending one of these conventions, and I am very glad to find Mr. Kean, from the city of Manchester, here this morning. I hope I shall be able to attend these conferences as long as I am connected with the department.

The department of weights and measures in New Hampshire has made progress during the past year, and it is a source of gratification to know that the public is apparently greatly in favor of the work. The wood law about which I spoke to the conference a year ago has met with success in every way, and I thoroughly believe it is one of the most important features of our work. Its chief purpose is to establish definite measurements by which wood for fuel purposes shall be sold. Prior to the passage of this act an iniquitous custom prevailed in New Hampshire of selling wood by an indefinite load measurement, which resulted in the public paying anywhere from $24 to $32 a cord for wood.

The department has laid particular stress on the enforcement of the net-weight section of the weights and measures law, and I find that it is tremendously more valuable since the passage of the Kenyon amendment, which requires that the net contents be expressed upon hams, strips of bacon, and other wrapped meats as prepared by the manufacturers for sale. Several packing houses have been prosecuted under this amendment, the result of which has been greatly to improve the conditions in regard to selling meats by actual weight.

The department is receiving the cooperation of honest merchants, who realize that the weights and measures law reduces to an honest basis competition among the dealers, some of whom formerly were apt to cut prices on the basis of short weight. I have conducted a campaign of education and have issued a cardboard folder entitled "Practical Facts and Suggestions for the Purchasing Public," which sets forth the gist of the work of our department, together with other information of a helpful nature. I can not emphasize too strongly the necessity of urging school superintendents to give some attention to the subject of weights and measures in the schools. Many school superintendents and domestic science teachers in New Hampshire have considered this subject of so much importance as to have it introduced as a special course in a good many of the schools. If the boys and girls are taught the importance of weights and measures while at school it will be easier for them when they become men and women to be more efficient in the management of their households. I constantly urge the housewives of New Hampshire to cooperate with my department and to report to me any violations of the law.

One of the strongest supporters of the department in New Hampshire is the manufacturer of textiles; the possession in such mills of a certified scale permits the purchaser of cotton, for instance, to save thousands of dollars annually in determining short weight in bales. It has been estimated on good authority that the inspection of weights and measures and of commodities has resulted in the saving of a million dollars annually to the citizens of New Hampshire. I consider that the reweighing of commodities is the keynote of the success of the department, and a persistent campaign has been made to compel the net weight of all commodities to be the basis of sale, rather than to include the weight of the coverings of burlap, paper, etc. In this branch of our work I am insisting that the consumer shall not pay the price of porterhouse steak for 8 ounces of heavy paper which the butcher dexterously throws upon the scale and includes in the weight of the meat. While I have no objection to protecting meats against contamination, yet I do contend that there is no need of such "hygienic wrapping" as 2 pounds of cloth or paper around meats, if the packer insists on charging 40 cents or more a pound for this guard against germs.

In closing I wish to state that the people throughout New Hampshire are taking great interest in the work of the department of weights and measures, for they realize that they are no longer paying tribute to unscrupulous dealers or contributing a million dollars a year to fraud of which they were themselves the victims.

NEW JERSEY.[3]

By FRANK WANSER, *State Superintendent of Weights and Measures of New Jersey.*

Mr. Chairman and gentlemen, it affords me great pleasure to report that weights and measures conditions are mighty good in New Jersey, owing to the splendid spirit of cooperation of all our county and municipal superintendents with the State department.

We are continuing our policy of working along practical lines, paying as much attention to reweighs and other matters along those lines as to the testing of equipment, although we do not neglect in any way the latter feature, our last annual report showing that nearly a half million pieces of weighing and measuring equipment were given attention during the fiscal year of 1919.

We have been remarkably fortunate during the past few years in matters of constructive legislation, all of the bills offered by the department having passed both houses of the legislature without a dissenting vote.

The session just closed passed two bills which were of the utmost importance to the members of our department.

The original weights and measures act of 1911 made the appointment of weights and measures superintendents mandatory in counties but optional in municipalities of 60,000 inhabitants or over. An amendment to the act, passed this year, puts the municipalities on the same footing as the counties.

The second bill placed assistant county superintendents and municipal assistant superintendents and secretaries under tenure, and as the superintendents were already protected in this way, it places all of our county and municipal weights and measures officials (or, in other words, our entire force) under tenure of office.

These bills were prepared by the legislative committee of our association and were heartily supported by the State department, for the reason that they make removals for political reasons impossible and constitute a strong step toward efficiency and a perma nent force of men.

Two other of our bills became laws, one providing for the appointment of public weighmasters and placing them under the supervision of our department, the other providing for the marking or stamping with name and address of the packers on crates, baskets, and carriers in which fruits and vegetables are to be sold or offered or exposed for sale; both of these acts are along the line of constructive legislation.

I believe that last year I voiced the sentiment of our State association in advancing the statement that New Jersey had the best set of workable weights and measures laws of any State in the Union, and up to the present time we have not found any reason to change our opinion. I do feel, however, that we need more stringent Federal legislation, particularly in the way of standard containers for foodstuffs and the proper marking of same.

Our Mr. Schwartz has prepared a paper on these subjects, which is heartily indorsed by our association.

[3] This report, prepared by Mr. Wanser, was read by Mr. A. W. Schwartz, in the former's absence.

In closing, I wish to say that the importance of our work has been so clearly recognized that the counties, municipalities, and State have shown their appreciation by practically a general increase in salaries from the local assistant superintendents to the State staff, so that at the present time we have the best paid set of weights and measures officials in the country.

NEVADA.

By S. C. Dinsmore, *State Commissioner of Weights and Measures.*

Gentlemen of the convention, in 1911 a representative of the Bureau of Standards, Mr. Holbrook, made a tour through the Western States and stopped off at my home town of Reno. He visited several of the towns roundabout, and also made a tour of the southern part of the State, coming back to my laboratory. He pointed out the necessity of weights and measures legislation in Nevada, since he had found very bad conditions. We at once got busy, and the following spring we succeeded, after a little fight, in getting what we considered to be a fairly good weights and measures bill through the legislature. It became operative in January, 1913. For different reasons, one of which is economy, the department of weights and measures is a branch of the food-service bureau.

Our State in area is big and in population small, so we feel that with the present conditions we can save the State money and at the same time do a fairly good job at weights and measures work. I have in mind certain amendments and certain additions to that law which I believe will improve it, and these will be introduced at the coming session of the legislature. We are doing our best in our small way to give the people service in weights and measures work. As I stated a moment ago, the territory we have to cover is large. For instance, to get down to the southern part of the State from Reno necessitates a trip of 1,100 miles by way of Los Angeles or Salt Lake City. Of course, that involves considerable expense, and we are not able to make our inspections as frequently as we would like to, but later I hope we will get legislation so that we can appoint public weighmasters in the same manner as the other States, in these outlying districts, give the people of those districts more attention, bring them closer and cause them to realize what weights and measures work means. We are meeting with the hearty cooperation of the merchants, and the work is popular with the people.

Mr. Chairman, this is my first attendance at a conference of weights and measures officials, and I am very glad to be here, and I fully appreciate that it is going to be a good education for me.

The Chairman. If a man comes all the way from Nevada, he is certainly in earnest and I am quite sure he will reap benefit.

NEW YORK.

By W. T. White, *Director, Bureau of Weights and Measures.*

Mr. Chairman and delegates, I am not prepared to give a detailed report of the weights and measures activities during the past year in New York State. We have not attempted to take up any new phases

of the work due to the fact that we deemed it advisable to devote our attention to assisting the people to get all they pay for and in this way do our part to relieve the abnormal situation resulting from the increased living cost. I might add at this point that in my judgment a weights and measures official's first duty is that of protecting the purchaser of foodstuffs, as these commodities are dealt in more extensively and by more incompetent persons than any other article affecting our daily living.

Mr. Johnson, of California, has spoken of the assistance he receives from his men, and I feel that I would indeed be an ingrate if I failed to say a word about the cooperation I receive from my sealers. These men are not appointed by me, nor do I have the power of removal, still they are required by law to carry out any orders I may give, and in this connection I wish to say that they have always been loyal and willing to cooperate at all times, and without their valuable help I think any State department is doomed to go upon the rocks.

About a year ago I started a Sealers' Monthly News Letter. This small publication is gotten out by my office and contains little items of local interest to the sealers, together with anything the sealers may contribute themselves. We also insert occasionally small technical articles, which are made as elementary as possible, so that the ordinary field man may grasp the meaning at once. This little news letter stimulates interest and serves the same purpose that organization literature does for commercial enterprises throughout the country.

We have also had published a popularized booklet entitled "Make Your Dollar Deliver One Hundred Cents Through the Door of Thrift by the Way of Accurate Weights and Measures." This pamphlet contains brief weights and measures tables, together with other information which is particularly interesting to the housewife, and the proof of its acceptability is shown by the great demand we have for it. At the time it was published all the sealers were given a supply for distribution and news items were inserted in the papers, which resulted in numerous requests for it coming in daily.

Special investigations were conducted last summer regarding the sale of ice and gasoline. Both inspections proved very successful and the data obtained were very useful for publicity purposes; furthermore, a number of prosecutions were successfully made in connection with these drives.

During the last session of our legislature we caused to be introduced some very good legislation, and while we were not successful in securing the passage of all of it, we did get part of it through. In brief, this legislation was in the form of amendments to the sections under which we are now operating, with the exception of one bill, which was to create a standard weight loaf of bread.

In conclusion, I would like to state that I always feel benefited by attending these conferences. Coming in contact as I do with the other delegates from the various States in our Union and exchanging experiences is an education in itself. Furthermore, the officials of the Bureau of Standards are to be complimented upon the splendid programs which they arrange, and the valuable assistance they give at these conferences is always appreciated by me. I find that upon returning to my own work things which have been brought out here are continually arising and are always of aid to me in conducting my own official duties.

I have with me to-day as a delegate a man whom you will all be glad to hear; that is Dr. F. Reichmann.

Mr. REICHMANN. Mr. Chairman and gentlemen, they have a law in the State of New York, a highway law, which does not allow automobiles over a certain weight to travel on certain bridges or over certain classes of highways. In order to enforce the law the State highway department, in conjunction with Mr. White, and at his suggestion and with his cooperation, is weighing automobiles and automobile trucks which go over the highways. They allow a maximum of 25,000 pounds on certain grades of highways. To determine weights they have a very ingenious little scale like an ordinary jack. They put these under the front and rear axles and jack the machine up and determine the two weights. If the owner of the automobile violates the law he is fined.

(At this point Mr. Charles G. Johnson, vice president, assumed the chair.)

OHIO.

By JOHN M. MOTE, *Assistant Chief State Inspector of Weights and Measures.*

Mr. Chairman and gentlemen, this is the third opportunity that I have had to attend the conference here. I was expecting a number of Ohio delegates here. I think some of them started this morning and probably will not arrive until to-night or to-morrow, but at present it seems as though I am going it alone. We were represented here last year by four county sealers of weights and measures.

The work in the State of Ohio is going along very well—far better than ever before—because we now have a more systematic system of inspection of weights and measures. There is more reweighing and checking done now than ever before, and we are finding a lot of discrepancies and short weights in various commodities.

There is only one thing that has really had a tendency to hold back the weights and measures work in the State of Ohio, and that has been the fact that the salaries of the county and city sealers of Ohio have not been raised in proportion to the increases in other lines of industry. I do not think I need to mention to this body that the public officials are probably the most underpaid class of men of any that we might mention to-day. As a result of that a number of our most efficient county and city sealers of Ohio have resigned, and other county and city sealers are not inclined to make the same number of visits over the county that they made formerly for the salary they are receiving. However, the report of the State of Ohio for 1919 will show that there were more inspections made within the year. There were fewer convictions, although there were more prosecutions than in the year 1918.

The assistance of the bureau has been a wonderful aid, and in a number of perplexing difficulties that have come up, and especially in cases involving such commodities as flour and meats and a number of similar commodities, we would have been almost unable to have met the situation had it not been for such assistance.

I mentioned at the last conference the net-weight sales law which had been passed in Ohio. That law requires that all commodities be sold by net weight only. We are succeeding very well in the enforcement of that statute throughout the State. We have also passed the

standard container act, which is similar to the one proposed by the Government and described by Mr. Downing at the last conference, and while that law does not become effective until November, yet two weeks ago a trip through the various fruit districts of Ohio proved that all the commission houses and the manufacturers as well are preparing to comply with that new standard container act to the letter. Public spirit is, I find, one of our greatest helps at the present time. I believe I am safe in saying that when the weights and measures laws were first enacted in the State of Ohio there seemed to be an idea among the people that it was just a law to create positions. However, at the present time they are more concerned with honest weights and measures. The cooperation that we are receiving from the general public in the State of Ohio is exceptionally good, and I am pleased to report that our work is held in higher esteem than ever before.

PENNSYLVANIA.[4]

By James Sweeney, *Chief, State Bureau of Standards.*

During the year ending November 30, 1919, the county and city inspectors of the State of Pennsylvania inspected a total of 386,471 weighing and measuring devices for the purpose of determining their accuracy.

Adjusted to meet the requirements of the State..... 12,969

Sixteen thousand six hundred and thirty-five of these devices were condemned and their use prohibited, for the reason they did not compare with the State's standards.

A great deal of the inspectors' time was employed in the examination of package goods, for the purpose of ascertaining whether or not the law was being complied with relative to the marking of the net weight of the contents in all goods found in package form. The number of pieces of this class of goods inspected and found to weigh correctly during the year was 511,569 packages. Fourteen thousand two hundred and forty of the packages inspected were condemned because they were not marked in accordance with the provisions of the law.

As many of the articles enter into the daily life of the citizens of our State, it is evident that they should be protected in the weight or measure of their purchases; when purchasing these packages wholesalers and retailers are entitled to the protection guaranteed to them by the law. The purchasing public who compose the larger part of our population must also be protected in their purchases. The inspectors of weights and measures are charged under the provisions of the weight and measure law with seeing that the provisions of the law enacted for the purpose of protecting the public is enforced. The public could be of very great assistance to inspectors of weights and measures in the enforcement of the law if they would report the violations of its provisions.

Within the past year in Pennsylvania laws have been enacted and approved by the governor providing for the examination by inspectors of weights and measures of the glassware used in the sale

[4] In the absence of Mr. Sweeney this report, prepared by him, was read by Mr. T. A. Seraphin.

of milk or cream. During that period this bureau has tested 14,842 bottles, pipettes, etc., used in the testing for ascertaining the percentage of butterfat in milk or cream; during the same period there were condemned about 1,200 because they did not comply with the standards required by this State.

The Acting Chairman. I have always had a great deal of regard for Mr. Sweeney's work on weights and measures. His report calls to my mind something that occurred in my State. We had occasion some time ago to have the containers examined in a factory in a small town in California which manufactured berry baskets. Mr. Downing came and made a survey of the containers for the State, which resulted in the confiscation and the destruction of something like 600,000 short-measure packages.

RHODE ISLAND.

By William F. Goodwin, *State Sealer of Weights and Measures.*

Mr. Chairman and gentlemen of the conference, mine will be a verbal report and a very short one, for I expect to be very much interested in the reports of the various committees, who have been working for several years on subjects vitally important, I believe, to the weights and measures officials of every State in the Union.

I want to say that I am very much pleased to meet so many old friends—some old-timers that have not been here for some time previous to this year. It is a great satisfaction to me at my time of life to meet old cronies and fraternize with them for a few minutes. I want to say that I am very much pleased at being here to-day; I am very much interested. I have not written any report on the subject, although I was invited to do so, for the simple reason that I expected to criticize some things which will be brought before the conference, and I did not feel as if I wanted to take time from any of our committees, for I believe that the time has arrived when we must act on some of these propositions. I realize the hard work, both physical and mental, that these committees have had to do, and I think that in justice to them we should try and settle some of the subjects that they will present to this conference. So I feel that I am on borrowed time. But I want to sincerely say that I am very proud to be here to-day; I am very proud to see so much interest manifested by the western and southern delegates. Of course, at the beginning the number of representatives from the different States was very small. In fact, Rhode Island, although one of the States close to the capital, never has been represented by anybody but the State official. On every occasion, for a number of years, I have endeavored to have them here, but for some reason or other, whether modesty or what it is, I have been unable to do so. Gentlemen, I hope some very good work will be done before we end our convention.

The Acting Chairman. I might take this occasion, gentlemen, to say something about the spirit, as I understand it, of the delegates from the West, since I have had the pleasure, of course, of mingling with them a good deal, and we become friendly. The men who come from the other side of the Rockies, or even close to them, come with the thought in mind to absorb from the minds of those on this coast

and in the interior the benefits of the past experience which they have obtained as a result of their activities. That is my view. I come here with an open mind, for the purpose of absorbing from these gentlemen the benefit of the experience they have had, and it is with a great deal of interest—a keen sense of interest—that I follow all the remarks made, and then analyze and take from them such as is good to be adopted to make our work in the far West more progressive. I believe that is the spirit of Mr. Dinsmore, and I know Mr. Howell always felt that way.

We are going to have a report from Mr. Kennerly, of South Carolina. I have had occasion to meet Mr. Kennerly, and I have been informed that South Carolina needs stimulation. I believe that when a State man is handicapped, as Mr. Kennerly appears to be, all the rest of us forming this conference should do something to obtain for him, perhaps, better laws and better working conditions.

SOUTH CAROLINA.

By H. S. Kennerly, *Inspector of Weights and Measures.*

Mr. Chairman and gentlemen, I am glad to report that South Carolina is taking an active interest in the strict enforcement of laws relating to weights and measures.

During the past year the State department of agriculture has employed two inspectors for this work alone, and in January these inspectors were able to make a report on the work done during the preceding six months, which showed clearly the necessity of the work. The publication and distribution of this report has resulted in a great deal of favorable comment from all sides.

Several of our cities have recently passed ordinances.

Our farmers are especially interested, for with cotton selling at 40 cents per pound they expect and should receive exact weights in this commodity.

The inspectors are especially interested at this time in the inspection of gasoline pumps, for this same high-priced cotton has resulted in the purchase of large numbers of automobiles and tractors. I hope to get such information here as will enable us to pass laws as good as the best concerning this particular phase of the work.

The head of our department is greatly interested in our work, and it is due to his spirit of helpful cooperation that we have been able to progress rapidly and successfully thus far.

We have not any very complete laws. As a matter of fact, I might say in closing that we have not exactly arrived; we are only on the way and have a fairly long track ahead.

SOUTH DAKOTA.

By Anton Runbeck, *Inspector.*

Mr. Chairman and gentlemen of the conference, Commissioner Frary, the chief of our State department, is in attendance at this conference but he was called down to the bureau of chemistry this afternoon, and at his request I will make the report for the State this afternoon.

It is a pleasure to be here this year representing the State of South Dakota, because we can now for the first time report work accomplished. We are now up against some of the problems solved years ago by older members here, and our attendance here will not be in vain. Last year I felt more or less lost among you, because I did not understand the technical work discussed. But a remark made by Dr. Reichmann has been and is of much value to me. He said, "Know what your job is and who your boss is, and you'll be all right." And in the year just passed I have learned enough about my boss and my job to treat both with respect.

We started the work of testing scales in January of this year, and since that time we have tested approximately 4,300 different pieces of apparatus in some 600 different stores, and we have found about 80 per cent of all devices tested to be correct. Considering the fact that previous to this year no scales of less than 1-ton capacity had ever been officially tested in our State, it is rather surprising to find that 90 per cent of the scales used in our groceries and meat markets are modern computing scales. When error is found, we find it due more to mechanical defects and lack of proper care of the scale than to deliberate attempts at short measure or short weight.

In linear measures we find that counter tacks are mostly in use, and measuring machines are found only in the larger dry-goods stores.

We find that dry measures are not used to any great extent, as the merchants are selling most commodities by weight, because of present high prices and close margins. We did find quite a few merchants using a liquid quart measure in selling cranberries and onion sets, but we meet no opposition in requiring that these commodities be now sold by weight.

As to liquid measures, we have by circular letters and personal appeal urged the hardware merchants of our State to put in stock sealed measures, and to sell only sealed measures for commercial use. We are meeting with fair success in this matter.

Our greatest source of trouble is the gasoline and kerosene pump and we have found it necessary to prosecute some merchants and garage men for failure to keep their pumps in proper working order.

We have also had considerable trouble with shipments of gasoline in barrels. Wholesalers are using barrels ranging in capacity from 53 to 57 gallons. Our law requires that the net contents be plainly marked on the barrel in terms of gallons. The Interstate Commerce Commission requires that a space equal to 2 per cent of the contents be left for expansion that may occur because of changes in temperature. But on account of the many different sizes of the barrels there are trouble and misunderstandings between the dealer and the customer. This trouble could be largely eliminated if we had a standard barrel and we would recommend that this matter of a standard size and weight barrel for gasoline be considered by this conference.

We have check-weighed hundreds of packages of foodstuffs, principally butter, candy, flour, and rice, and have caused corrections to be made where error was found.

Ice scales used in South Dakota are graduated in 5-pound divisions and ice tickets are issued in not less than 5 pounds denomination.

We find that a large number of our coal dealers are not furnishing a weight ticket for each load, as required by law, but we anticipate no difficulty in causing them to issue proper tickets with each delivery.

As a whole, we find on the part of the merchants of South Dakota a commendable desire to cooperate with and follow the suggestions of the weights and measures inspector, and so far we have had no serious complaints from the public, except on gasoline pumps.

Our law requires that we test all apparatus at least once annually, but with the present force of two men, it can not be done, as we have to visit over 6,000 merchants in more than 800 towns, scattered over a territory of 77,000 square miles. But we have the work well under way—and when we start anything in South Dakota we usually finish it.

The Acting Chairman. You say 4,300 devices were tested. How many did you say were found correct?

Mr. Runbeck. Ninety per cent of all devices were found correct; of scales, I think about 80 per cent were correct. We do not have the necessary equipment to test scales of a greater capacity than 30 pounds.

The Acting Chairman. You do not test heavier scales than 30 pounds?

Mr. Runbeck. We have not been able to, so far. We have not the necessary equipment.

The Acting Chairman. It might be wise for the delegates to ask any questions that may clarify their minds upon matters wherein they are interested in some particular States.

TENNESSEE.

By T. F. Mahoney, *Chief Inspector of Weights and Measures.*

Mr. Chairman and gentlemen, we have a law in the State of Tennessee similar to that in the State of Michigan, and we encounter the same trouble that has been encountered there. Our law is under the jurisdiction of a food and drug commissioner, who is ex officio superintendent of weights and measures. I received the appointment as sealer of weights and measures in the city of Chattanooga and have held the office for nine years. I got no results. I appealed to the governor of our State to remedy the law so as to provide for an independent State department. Last week I had assurances from our governor that at the January term an attempt will be made to amend this law.

As an example of the way the work is carried on at present, I may mention that my attention was called by a squire to a case in which a food inspector had been on the stand. This case involved a sack of meal. The food inspector had had a merchant arrested on the ground that the sack was short. The squire asked him how he knew the sack was short. The food inspector replied, "I weighed it on the scale." The squire said, "Did you test the scale?" He replied, "No, sir; I don't know anything about testing scales."

I can not tell you any more until January. I will assure you, however, that the State of Tennessee will have a weights and measures department of its own after that time.

The Acting Chairman. In the absence of Dr. Stratton, I may say that I am sure the Bureau of Standards will cooperate with you in obtaining proper laws in the same way that it did with me in obtaining my laws in California.

Mr. Hill. I know that you all know that the State I represent is on the map, although, perhaps, you are not as familiar with the city I represent; but I am going to ask the privilege sometime during this conference of making a report on that city. I am a big man in avoirdupois, and I come from the biggest State in the Union, and I want an opportunity to present a report on my town.

UTAH.

By T. L. Irvine, *Inspector of Weights and Measures of Salt Lake City.*

Mr. Chairman and brother delegates, I assure you that it is a pleasure to again meet here with you in this conference and participate in the benefits that come to those who have the privilege of attending. I know that the benefits that I have received and carried home to my people from these conferences have been considerable. We in Utah are indebted to the bureau here for helping us frame our law and in many other ways, and I know those who make appeal to this bureau will not make that appeal in vain.

Mr. Walter M. Boyden, the State dairy and food commissioner, who is ex officio superintendent of weights and measures in Utah, requested that I express his regret at not being able to attend this conference, and he assured me that if he is on the job next year he will endeavor to be here. I hope that he will be on the job because he is an efficient and capable man, a conscientious worker, and is very much interested in the weights and measures division of the department over which he presides. His interest is shown by the increased amount of work that the State deputies have accomplished in the last year. His last report shows tests on more than 6,000 weighing and measuring instruments, as against about 1,400 in the preceding report. Mr. Boyden informed me that he is going to equip two cars for weights and measures work, and he thinks this will make the work more efficient, since sleeping accommodations will be provided and his men will not have to seek the larger towns where hotel accommodations can be had.

We work in harmony together, every State and city deputy, and we have accomplished a great deal in doing so. Mr. Boyden has been commissioned to report to the Federal Government in matters pertaining to interstate commerce and transportation and all cases of that kind that come to my attention for violations of the law are referred to Mr. Boyden. I have in mind one case where a conviction was had recently involving short weight on a shipment of maple sugar. The offending party pleaded guilty and paid the fine.

One of the difficulties that we have there is the same as one that has been mentioned by other representatives here. and that is that we encounter packages only partially filled. I have had that up with the State superintendent. He and I are agreed in our opinion that the size of a package should be indicative of its contents.

We are firm believers in delegating more power to the Bureau of Standards in Washington here, and we feel that it is a duty of

weights and measures officials to use their influence with their Congressmen and Senators to assist the weights and measures department in getting remedial legislation. I do not believe that power, if it were delegated to them, would be misused. I believe that they should have the power to pass on types of weighing and measuring instruments that are used in commerce. I also believe that it would be a good thing to give to them greater power in designating how food products and other commodities should be packed, as far as standardization is concerned. I feel that a great deal of good could be accomplished by delegating this power to the Bureau of Standards.

I am very pleased to know that the subject of practical education is going to be taken up on the program. It seems to me that if we are able to educate the public our work will be much simplified. It is necessary to get cooperation of the public in order to get the maximum of efficiency. I hope that sufficient time will be given to the discussion of practical education at this convention that we may all be enabled to take something home that we can introduce into our high schools and other institutions of learning; that we may be able to go before clubs and societies and teach them the practical things that they need to know in order to properly protect themselves in the purchase of foodstuffs, as well as other commodities. I agree with Mr. Johnson of California, who is now presiding in the chair, that it is a great benefit to us in the West to come here and mingle with you people who have had a great deal of experience in the more populated centers of industries, and we come here, or at least I come here, with an open mind to receive the suggestions and take the things that we learn back home and put them into practical use in our States in the Rocky Mountains. I do not know that I have anything further to say at this time, but I hope to be able to take part in some of the discussions that we have here and I hope that I may be able to do something or give something to this conference, even though it is only as a grain of sand, if it will add its part in helping along this good work. I thank you, gentlemen.

VERMONT.

By H. N. Davis, *Deputy Commissioner of Weights and Measures.*

Mr. Chairman, I think Vermont has been represented at every national conference, except the last, since the legislature passed a bill creating a weight and measure department.

The legislature of 1917 passed a bill making the State treasurer ex officio commissioner of weights and measures, and the department has been conducted since under that head.

Much needed legislation has been passed and progress made in the department under the direction of Mr. Walter F. Scott, State treasurer. The last session of the legislature passed a bill providing for the marking of the net weight on packages of food. The law making it necessary for the prosecuting officer to prove intent to defraud on the part of the person who sells less than represented of a given quantity was amended so that it is no longer necessary to prove such intent.

The salaries of the inspectors and clerical force are fixed by the board of control. The commissioner has made several important rulings by virtue of the power given him by statute.

Coal dealers are required to furnish a weight slip to each customer showing the gross, tare, and net weight thereon.

The owners of gasoline pumps are required to test them with sealed measures before the first sale each day.

All wood sold in the State, except slabs, edgings, and mill waste, must be sold by the cord or fraction thereof.

There has been a marked improvement in the sentiment of the people toward the department in the past few years. The merchants have come to feel that we are protecting them against dishonest competition and the people feel their interests are being safeguarded. For a number of years it was a fight to keep the department; now I think it would be impossible to get a strong enough aggregation to defeat it.

We have been helped materially in the past two years by the support of Gov. Clement, who has always been an untiring worker for our department. We are very well satisfied with the progress made and shall continue to make our department a live one.

I thank you.

VIRGINIA.

By JOHN W. RICHARDSON, *State Superintendent of Weights and Measures.*

Mr. President, State superintendents, sealers, and future prospective members of the electorate of the United States, after a conference with Hon. Westmoreland Davis, Governor of Virginia, it was mutually agreed to ask the General Assembly of our State, which met in January last, to reenact our weights and measures law and transfer the duties imposed to the department of the dairy and food commissioner. To this end, the governor had a bill drawn by Mr. Morrissett, chief of the Legislative Reference Bureau, which being submitted to the General Assembly, failed of enactment.

This left the law in its original form, and myself still in charge as State Superintendent of Weights and Measures; hence my presence here again as Virginia's representative.

I am glad to notice the gradual increase from year to year in the membership of the conference, and the interest manifested in the weights and measures departments of our State Governments, and hope to see a fulfillment of the objects mainly in view—viz, the enactment by every State of our suggested model law, and the establishment of a general uniformity in weights and measures; the abolition of the dual system now in vogue, substituting instead, through an act of Congress, that all dry commodities, usually sold by measure, shall be sold by weight or numerical count; that all package goods shall be sold by net weight, and that the same be conspicuously marked on such packages.

Section 14 of the bill drafted by Mr. Morrissett read as follows: "It shall be unlawful to sell, except for immediate consumption on the premises, liquid commodities in any other manner than by weight

or liquid measure, or commodities not liquid, in any other manner than by measure of length, by weight, or by numerical count," etc., and it is my opinion that the introduction of the weighing of liquids along with dry commodities, as specified in our amendment to the model law, had something to do with the failure of enactment of the whole bill, which amendment, you will recall, recites that all dry commodities shall be sold by weight or numerical count unless otherwise agreed in writing and by the mutual consent of the buyer and seller.

A bill to regulate the sale of bakery products, placing its enforcement in the hands of the State dairy and food commissioner, reads, in section 3, as follows:

> Weights and labels.—All bread stored, sold, offered, or exposed for sale by the loaf shall have conspicuously affixed thereon a label on which shall be printed in the English language in letters and figures not smaller than one-fourth inch in height the net weight of loaf when baked.
>
> The name and address of the baker or manufacturer of the loaf shall also be shown on same label.

This section conforms, in the main, with section 18, Form No. 1, of the proposed model law adopted at our eighth annual conference in May, 1913.

The 1920 session of the general assembly recorded its second refusal to reenact the Virginia weights and measures law, and has thus signified its approval of the present condition of things and my administration of the duties of the office, in that it has in the latter instance refused to transfer this department to the control of the dairy and food commissioner.

I occasionally receive notice of the appointment of a county or city sealer where none has been had for a number of years, and have filled orders covering their equipment of testing apparatus.

Some objectors to a change in the law gave as their reason that the same would require the wives of farmers through the country to mark the net contents on every pound of butter they put up in package form for sale, and others objected to the proposed change in the law, in that if the salary were made payable by county and city appropriation instead of by fees it would place an additional expense on many counties and cities not able to bear the same.

Not hankering for more work than is imposed upon me in the performance of the duties of the Land Office and Superintendent of Grounds and Buildings, I am hoping that some day our General Assembly will make many needed changes in the State's weighing and measuring law and transfer the duties thereof to the dairy and food commissioner or some other State department, or make it a separate and distinct State department, paying its superintendent a salary commensurate with the duties necessary to carry forward and make efficient this much-needed department, which can be made of such material benefit to our people, embracing both the seller and consumer. I have persistently advocated the abolition of our long-standing and inefficient system of paying sealers by the fee method, and I think I can demonstrate the wisdom of this position by reference to the good work now being done by the sealers in such cities of our State as have enacted ordinances permitting compensation by salary. Until our General Assembly does likewise it will remain as now difficult to secure a full complement of sealing officials.

I am informed Congress has failed as yet to pass the resolution and petition reaffirmed and made by this conference at its eighth annual meeting, providing for the sale of all dry commodities by weight and numerical count (except when otherwise agreed to in writing by the seller or buyer). Mr. Roberts, who is the superintendent in the District of Columbia, made the statement before the conference that the Congress has thus far failed to enact this resolution in the law in the aforesaid District, where Congress has direct power to do so. Under these circumstances when may we expect enactment of this same resolution for any of our States?

At the present time we have much trouble with the commission merchant who insists on buying by weight, while the farmer insists on selling by measure. I will call attention to only one dry commodity, namely, wheat. One farmer raises well-matured wheat which will measure up to the legal standard of 60 pounds per bushel when it reaches his commission merchant, while his neighbor produces a wheat full of chaff, which, when it reaches his commission merchant, does not weigh up to the standard because of its inferiority. When the latter receives his return, he kicks because his wheat did not weigh up to the legal standard. Now, if we will enact a law applicable to all the States of this Union requiring all dry commodities to be sold by weight, there will be no cause for complaint because one man will get as much for his 60 pounds of wheat as the other, quality being the same.

With these few scattered remarks I wish much success to the future deliberations of the conference at this meeting. Before taking my seat, I would like to know who are here to-day who were of the small company which organized this conference in January, 1905, and so will ask such to stand up.

WISCONSIN.

By Ralph W. Smith, *Chief State Inspector of Weights and Measures.*

Mr. Chairman and gentlemen, I am somewhat unfortunate in that the name of my State begins with "W" and is away down at the end of the alphabet. I would like very much to express my feelings at the privilege of attending this conference, but I can not do so without duplicating what has already been said by somebody else. I think the best thing I can do is to subscribe to all these sentiments and let it go at that. I shall not attempt to give any detailed record of the work we have been doing. I think most of you know that the State department and the city departments in the State have been operating for a number of years—since 1911.

The work previous to my coming to the State was in charge of a man whom you all know—Mr. Downing—and since my advent I have endeavored to carry on the work which he so ably started. There is one thing which we have developed in our State during the past two years which may be of some interest to State or city representatives here. I refer to our use of automobile trucks in the work. I was very much interested when our chairman was telling about the trucks which he was using in California. They are of a more elaborate type than the ones which we have, but I dare say that his trucks cost many times what ours do. We have developed an inex-

pensive outfit based on a 1-ton truck chassis, and we have, we think, a very good working outfit for general conditions. This outfit we use throughout the State, over all kinds of roads—anything we may encounter. It is used by the State inspectors in traversing their territory. We have three of the trucks in use at the present time, each operating with two men. If any of the delegates are sufficiently interested, I will be glad to give you figures on the cost of such an outfit and on the cost of operation, and show you a few simple diagrams that will give you an idea of what the outfit is.

I may also mention that we use a four-wheeled all-metal truck for supporting the test load and transporting it to different positions on a wagon scale platform. This was an idea of one of the State inspectors which we had developed through out State department of engineering, and we have what has proved to be a very efficient and satisfactory device. It not only saves a great deal of time in wagon-scale work but also saves a great deal of strain on the inspector's back and gives an excellent test. Our 1,000-pound load is concentrated in an 18-inch square. There are but two operations—the loading and the unloading. Thus we lift 2,000 pounds, whereas under the old method of testing a wagon scale a man frequently is obliged to lift as much as 7 or 8 tons in one of those tests; so that you may imagine that the inspectors are quite enthusiastic, and we feel also that we get fully as good a test, if not better, than we got before. I have a drawing of this device also, showing its arrangement in detail. It is all metal and the cost is not prohibitive. I will not bore you by going into any more detail on that.

The Acting Chairman. That was a splendid report.

Have all of the State delegates reported? If some were absent when they were called, I will ask them to kindly report now.

REPORTS OF OTHER DELEGATES.

The Acting Chairman. If there are any States from which officials are present which are not represented by State delegates, I will ask that some sealer from a city or county report for such State now.

Mr. Augustus F. Bove, sealer of weights and measures of Portland, Me. I am not the State representative, but I represent the city of Portland, Me.

I regret that I can not report in writing, but I am glad to have the privilege of being with you, and also to have the privilege of representing one of the best cities on the map. I regret, however, that my State is not represented by the proper official. The department of weights and measures is under the jurisdiction of the commissioner of agriculture. Shortly after I returned from our last conference a year ago the commissioner of agriculture came in to see me and wanted to know something regarding this conference. To the best of my ability I told him what was done here. I told him that this was a school of instruction, and that I learned more in the week that I was here at the conference than I did in the year of experience that I had had, and therefore the commissioner of agriculture, Mr. John Roberts, promised me faithfully at that time that he was going to be here.

A few minutes ago my friend from Utah said something regarding laws that should be passed governing the different measuring devices

on the market. The State of Maine, at our last legislature in 1919, passed a law of that kind, and with your permission I will read section 1:

> It shall be unlawful to sell, offer for sale, or give away any scale or other weighing or measuring device until a scale or measuring device of the same manufacture, type, and kind shall have been approved by the National Bureau of Standards in Washington, D. C., and until a certificate of said approval shall have been filed with the State sealer of weights and measures in Augusta, which certificate shall state the name and manufacturer of said scale or other measuring device, the place where manufactured, and that the same has been approved by said Bureau of Standards. This act shall not apply to liquid or standard dry measures.

At this time I wish to express my sincere thanks for the valuable assistance that I have received from the Bureau of Standards.

I thank you.

The Acting Chairman. That ought to inspire some of the other field men to take advantage of this opportunity, if they so desire, to report from the respective jurisdictions. Any person may have the floor now for a few moments.

Mr. Charles P. Murray, president, Massachusetts Association of Sealers. Mr. Chairman and gentlemen of the conference, I am quite surprised that my old friend has taken advantage of me as he has, because I have to have a little time to collect my thoughts, especially when speaking before a gathering such as this, and therefore I am somewhat flabbergasted at this moment. I want to say that I am very glad to be here, Mr. Chairman and gentlemen, to report for what I believe to be the oldest State organization in this country, the Massachusetts Association of Sealers, that last October held their twenty-third annual convention. I hope at the same time, when the discussion is ended, to enter a resolution indorsing the Bureau of Standards for what they have done. I feel that I am as well acquainted with the motive that led up to that unwarranted attack we discussed this morning as any other, and can perhaps enlighten you gentlemen at the opportune time as to what caused that man to make this attack.

I want to say, furthermore, Mr. Chairman, that a matter was mentioned some little time ago about the appreciation of the assistance of some particular State as to work that had been accomplished by the weights and measures officials here. I believe that the work of the sealers of weights and measures throughout Massachusetts has been recognized as being as good as any other State in this country. We have men here at the present time that have received an advance in salary of $500, and others have received a $300 increase. So you can see we are quite selfish in respect of our services. I think the last conference I attended was in 1914. I was inspired by the knowledge I received here, and I carried back a very glowing report of the doings of the convention.

I believe we, in Massachusetts, have one of the best associations throughout this country. We always have sufficient funds to back any legislation that we want enacted. Our association always has funds. I believe we have more money than any association in any other State in the country. We back our ideas solidly and firmly, and we use money, if necessary, to circulate propaganda throughout the Commonwealth to educate the people, and request them to de-

mand through their representatives the legislation that we are seeking to have passed. I do not claim all the credit. I have called the boys' attention to legislation we wanted passed, and they have done their work very well.

The Acting Chairman. Is there any other sealer who desires at this time to have the benefit of the floor?

Mr. Charles M. Fuller, county sealer of weights and measures, Los Angeles, Calif. Mr. Chairman and gentlemen, I would like to say just a few words regarding several experiences which we have had which I think might be of interest to you. Mr. Johnson told about all dry commodities being handled on a weight basis. Several of you asked me how that applied to berries. It simply means this: Berries are handled in a regular-size basket, but they must place 12 ounces of berries in the basket. Not only must they use a standard-size basket, but they must fill it up so that it holds 12 ounces. Most of the berries are grown by the Japanese berry growers. They have got the market cornered. The Japanese must have come from Missouri, because you have got to show them. At the beginning of every season, as the berries begin to get cheaper, they begin to try to pack a little less quantity. They will be coming in with their trucks at 2 o'clock in the morning, and we plan it out ahead that we will catch them there. We arranged the last raid that way. We condemned some 2,235 boxes of berries, which were given to charity.

As an example of how a public weighmaster works and how it helps the man who is depending on this weight: There was a man up in Los Angeles buying some hogs on a weight determined by a public weighmaster. The public weighmaster made a mistake in computing which resulted in a loss to the purchaser of some $150. He did not discover it until some time afterwards, and in the meantime the man from whom he purchased the hogs had left the country and could not be located; and even if he had been there, it might have been necessary to bring civil suit for the recovery of the money. This weighmaster was summoned to the office and the matter explained, and it was put up to him that he would have to make good the amount or suffer the loss of his bond. He made good the amount. It was perfectly right, because it was through his mistake that it happened.

There is one matter I hope will be taken up at the conference, that is the matter of providing a better method of sealing, so that whatever sealing device is used will be of a permanent character. We educate the public to look for the seal on the scale to show that we have visited it, but the paper stickers we use peel off or some one will scratch them off, so that many times there is no mark left on the scale two or three months after it has been visited to show that it has been tested.

There is just one more thing, and that is that we are fortunate in California in having a chief of the State department that everybody can work with. As the governor of the State said, he is a man who gives a punch and can take a punch and at the same time use tact in such a way that it does not cause opposition from the people at large.

Mr. William B. McGrady, deputy State inspector of weights and measures of Pennsylvania. Mr. Chairman. I have not very much to say. I am only a new man in the State service, although I was for-

merly connected with the department in the city of Pittsburgh. In Pennsylvania they call us "cheater chasers." We hear so much about inspecting scales, weights, and measures, and different things like that, that we all know how to do that. Some men go out in an easy way, others in an impulsive way. I have been doing field work in Pittsburgh for eight years under the direction of Mr. Livingston.

We have very good laws in Pittsburgh. We can cover everything there, even if the laws do not fully cover it; by a little education we can get the storekeeper to do what is right. I have two counties under me in the western part of the State. Without exception, everything in those western counties of Pennsylvania, with the limited knowledge I have in mind, are 99.44 per cent good. I thank you.

(At this point a motion to adjourn was made and seconded, and this motion was agreed to.)

(Whereupon, at 4.45 o'clock p. m., the conference adjourned to meet at 10 o'clock a. m. Tuesday, May 25, 1920.)

THIRD SESSION (MORNING OF TUESDAY, MAY 25, 1920).

The conference reassembled at 10.30 o'clock a. m. at the Bureau of Standards, Dr. S. W. Stratton, chairman, presiding.

The CHAIRMAN. The meeting will please come to order.

We are very fortunate in having with us this morning the Secretary of Commerce, Mr. Alexander. Those of you who have been with us before remember how Secretary Redfield opened our meetings and took great interest in our work. Secretary Alexander is equally interested. He is not yet, of course, as familiar with the far-reaching nature of the work of this conference, but he is thoroughly interested in all the work of the Bureau of Standards and is giving us very able support. I am very glad, indeed, that he found it possible to be with us this morning and that we are to have the opportunity of meeting him. Secretary Alexander.

ADDRESS BY THE HON. JOSHUA W. ALEXANDER, SECRETARY OF COMMERCE.

Mr. Chairman, ladies, and gentlemen, I am very much pleased to have the invitation to be present this morning. While my time is quite fully occupied and I have many duties requiring a very wide scope of activities, yet I take a very great interest in the activities of the Bureau of Standards. I have never gotten into all of its secrets yet. While I have been out here two or three times, I have hardly scratched the surface, but hope in the months to come to become more familiar with the various divisions of this bureau and their activities, because I regard it as very valuable to the interest of the country.

This is the great laboratory of the Nation, and I doubt if all our Government officials, including Members of Congress, fully appreciate the value of this bureau, not only to the Government but to the country at large, and I am quite sure that the country does not realize what we have with us—the extent of this plant, the different activities of the various divisions of the bureau, and the splendid personnel of the bureau, the technical men, the scientific men who are employed here, and who are accomplishing so much of interest to the country. I do not know of any better way to stimulate the public interest in the activities of this bureau and to give the country a proper idea of its value or its worth than a conference of this sort.

I understand the first conference was held in 1905 and that the attendance then was limited to a few States. I believe there were eight States represented and only two States with official representation, Massachusetts and Virginia; and I am glad to know that these conferences are growing in interest each year. I am told that at the conference last year 28 States and 64 cities and counties were represented, and the hope has been expressed that the representation this year will be quite as large and as representative as it was last year.

Of course, during the period of the war the activities of these conferences were suspended; but this, I believe, is the thirteenth conference, and judging from those present this morning I have reason to believe the representation will be as great this year, if not greater, than in any previous conference—already I have met one representative from the State of Minnesota and one from the State of California. Well, if Minnesota and California can spare the men and pay their expenses to attend conferences like this there is no excuse why the States in the Mississippi Valley and along the eastern seaboard might not all be represented in these conferences.

I understand the objects of these conferences are to bring about uniformity in the standards throughout the United States as well as a standardization of methods of inspection, and to secure uniform legislation in the States. It is an anomaly that it is necessary to do this. Now, the Constitution of the United States rests in the Congress the power to fix standards of weights and measures, and why that power has not been exercised long ago is not easily comprehended, because it is manifest to the most casual thinker that we should have uniform weights and measures applicable to all the States of the Union. We have 48 different States, and their relations are becoming more intimate every year. Our commerce is interstate and it is of the utmost importance that we should have uniform standards of weights and measures; and as the Congress has been vested with that power I hope this conference will give the question serious consideration, with a view of having Congress in the near future exercise the power that will simplify this question and provide uniform standards to be observed by all the States.

In the meantime you are rendering a very great service, because in these conferences you are undertaking to frame a uniform law to be adopted by the several States of the Union. That you are attempting in this way to bring about the uniformity which could be established by an act of Congress—not only standards for States but for municipalities—proves the value you place upon uniform standards, and if you accomplish this you will accomplish a great work in the interest of the public, because each year it becomes more important for us to have these uniform standards.

In industry it is important. Manufacturers should know what these standards are, and they should be required to conform to these standards. The public has the right to know what the standards are, and the interests affected shall conform to them; and now that the cost of commodities has increased to such an extent it is important that the public should be assured in purchasing that they are purchasing according to approved standards and are getting what they pay for.

Now, I understand this conference in the past has formulated and agreed upon a uniform law; that it has been introduced in the legislatures of the several States, and has been enacted into law by a number of the States; and that a standard of weights and measures for municipalities, formulated by you, has been adopted by many of our cities. Well, of course, this is going at the matter in detail, and involves great labor and no little expense. It grows out of the complex organizations of our Government, the fact that we have 48 States and a great many cities, and in the absence of the exercise of

the power vested in Congress it is necessary to get at this problem in this way. Every year it becomes manifest that we need greater uniformity in our laws in the several States.

I believe they are suggesting now that we ought to have uniform divorce laws and that Congress ought to fix the standard, not only in the District of Columbia, but throughout the country.

We see numerous gasoline stations scattered over our cities. Well, since gasoline has increased from about 6 cents to 30 cents and up per gallon it is of interest for the public to know that these various devices are accurate in measuring gasoline. I do not know how many of them are uniform and accurate; you do not know how many there are that are uniform and accurate. I understand one of the purposes of this conference is to consider that question, and with a view to fixing a standard of accuracy and requiring the manufacturers of these pumps to conform to that standard.

Just before coming to the hall I was in conversation with representatives of a prominent mail-order house. They are here and they are interested in having certain standards fixed.

But I only wish to emphasize in a few words that I am expressing here the thought—the importance of the very great work you are doing and the very great service it will be to the country; and it shows that the States you represent, the communities you represent, have a proper appreciation of this service, and I am very glad to know that you enter into the spirit of the service, realizing that you are performing a service of the greatest benefit to the public. It is only in this way, by voluntary service, having in view the public welfare, that we can accomplish so much for our several communities and for our States and for the Government: I certainly hope that your deliberations will be profitable, and that you will achieve substantial results, and that your stay in this beautiful city will be full of pleasure, and that you will be amply repaid for the expenditure of time and money in coming to Washington.

GASOLINE PUMPS FROM THE STANDPOINT OF SAFETY, BY A. R. SMALL, VICE PRESIDENT, UNDERWRITERS' LABORATORIES.

Mr. President, ladies, and members of the conference, perhaps it is just as well that Mr. Alexander has left the room before I have started to say what I have to say to you. Had he not gone, Mr. President, I would have been glad, while not a member of the conference, to speak for a moment expressing to him the entire confidence the engineering people and the fire insurance fraternity have in the excellent character of the establishment and the staff of the Bureau of Standards. The Underwriters' Laboratories performs a work on a small scale not unlike the work which the Bureau of Standards performs on a large scale. Our work is limited in its scope to the matter of fire prevention and to the matter of the prevention of accidents. The work of the Bureau of Standards affects the work of every one of us, affects the work of every person in this country, and of many people in many countries. Through 5, 6, 8, and 10 years' close personal association with many members of the staff of the Bureau of Standards, and through a like period of opportunity of observing the wonderful way in which your president, Director Stratton, has conducted the work of his organization, I feel sure that

Mr. Alexander need not take the time, if he is too busy, to come out here to investigate what is going on, but can stay down town and rest assured that everything is being done that can humanly be done to carry forward the great mission of this institution.

I will now return to the subject of my paper, "Gasoline pumps from the standpoint of safety," assigned for this period of your program.

This subject is possibly misleading. Therefore, it is my purpose at the very outset of these remarks to remove, so far as possible, any misunderstanding which may exist regarding the safety significance of such equipment. The word "safety," as now very largely used in industrial and engineering circles, refers to the personal accident hazard. Many of us are well acquainted with the very active and effective part which our host of to-day, the staff of the Bureau of Standards, is taking in devising and promoting measures designed to mitigate the personal accident hazard, or, in other words, to promote "safety."

Gasoline pumps bear upon the safety cause, the personal accident hazard, only as a by-product of another and quite as active hazard, namely, the fire and explosion hazard. With this eliminated, the demands of safety are fully met, perhaps, to as great a degree as with any utilization equipment found in our modern and extremely busy life.

There is no need to explain nor perhaps even to state the hazards either from fire or from explosion or both combined which are ever present where gasoline is involved. Even with the modern product, perhaps misnamed gasoline and more properly called "motor fuel," the explosion and fire hazard or danger is imminently present, otherwise it would fail in its intended function as a motor fuel. This being so, it naturally follows that with its very general distribution and practically universal use there exists in every community a fire or explosion hazard of potential greatness possibly exceeding that from any other single source—a hazard of a capacity to destroy by fire industrial, commercial, mercantile, and dwelling properties singly or combined to a greater value in any one of numerous exposures than is the value of all the gasoline consumed in any season throughout the Nation. Nor may the secondary or by-product hazard of such a catastrophe, or the secondary or by-product hazard of the multiple minor manifestations of this potential catastrophe resulting in personal injuries and therefore bearing upon the safety cause be entirely ignored.

Fortunately, there is another side to this picture. The potential hazard, the calamity pictured, is safeguarded, in the main, effectually. Generally speaking, gasoline in bulk is handled only by those well trained in the necessary precautions for controlling its powers of violence and disaster. In its transportation and distribution Federal, State, and municipal authorities find the industry which handles it providing equipment and observing practices generally well designed to take into account its inherent fire and explosion hazards; otherwise the industry would destroy itself. In the retail handling similar fortunate conditions prevail to a very large degree. The gasoline pump with its underground storage tank has and continues to perform well the gigantic task of confining the fire and explosion

dangers of gasoline, to the end that we are not obliged to drive out into country places for our supplies, but find them as readily available for prompt delivery as are other commodities in daily demand and use.

Alike with other prevention movements, the statistics of this accomplishment can not be compiled; to prove by cold figures the property losses prevented, the accidents avoided, and lives saved because of the widespread use of gasoline pumps is impossible. This condition is perhaps not unlike one probably existing in the field in which most of you are active. Data as to the actual losses on shortages which the public would suffer were your work to be abandoned can not be other than estimated. You are unable to prove to what extreme any particular industry or business might go in the use of short weights and measures were your activities to be cut short. We in the fire-prevention work and those in the safety engineering field must be satisfied with the knowledge that our work is effective and with the negative fashion by means of which our results must be demonstrated. With all these limitations in mind, I nevertheless have no hesitation in going on record as of the fixed opinion that the very general use of gasoline pumps in the retail distribution of gasoline has made possible the present-day development of the automobile. I further state, without fear of contradiction from anyone informed as to general causes of fire and explosion losses, that this very modest appliance and the modest industry which produces it have effected, assuming a similar general use of gasoline without the safeguards they now provide, an annual saving of loss of property from fire and explosion equal to the present annual fire loss from all other causes combined. In other words, an annual saving of $250,000,000, an amount sufficient to pay the interest upon the fourth Liberty loan, accrues to this country because of the widespread installation and use of this device.

So much regarding "gasoline pumps from the standpoint of safety." Your efforts I must assume are in no way opposed to the conservation which I have declared has been and now is secured from their use. I must assume also that you are ready to take notice, if you have not now done so, of the principles involved in this equipment which are paramount in making possible a record of service such as has been claimed. The secret of the success of the gasoline pump in securing the measure of safety claimed for it is not a secret to those who have given even the briefest study to the hazardous properties of gasoline.

The chief principle is the underground storage of the supply of gasoline, which it is the function of the pump to deliver. This principle more than any or all others must not be ignored in any efforts which you may make to have pumps function as accurate measuring devices. The next principle of importance is the confinement of gasoline during the operation of its delivery from the place of storage of main supply to the receptacle of use. The property of evaporation at atmospheric temperatures and pressures is the important factor in the hazard of having gasoline about. Otherwise, it would rate as to hazard with kerosene and other petroleum products of high gravity and flash point. Designs providing substantial strength, materials of proven durability, workmanship of the best

are all subordinate to these two principles for good gasoline pump performance.

Please, in your very proper concern as to the performance of gasoline pumps as measuring devices, do not fail to give proper and very substantial weight to these two essentials. Otherwise it can readily be that the old example of foolish economy is fully demonstrated and the saving at the spigot of accurate measurement will be but a drop in the bucket to the loss at the bunghole from fire and explosion waste to follow.

The Underwriters' Laboratories of Chicago, established and maintained for service—not profit—by the National Board of Fire Underwriters, now has behind it an experience of 25 years in dealing with utilization appliances of many kinds, with the manufacturers of such appliances, and with the problems of their proper performance in service. From this experience I can draw for you a lesson well learned and apparently of important interest in the very problem which you are here to consider. I hope you will not fail to give it very thorough consideration nor to apply it in full. This lesson is that to provide a substantially made and well designed device is but half or less of the battle of fire prevention. The other and better or "larger" half is to have such devices properly installed and correctly maintained for their entire period of use. The entire effort of all concerned in the manufacture and installation of a fire door, for instance, is completely wasted if at the time the fire comes the door is held open by a truck or some such object permitting fire to travel through as though the door did not exist. In the case of gasoline pumps installation and maintenance after installation are important factors possibly to the extent of the "larger half" referred to. Certainly from the point of view of fire protection their importance may not be ignored. It would seem to me that from your especial point of view they may be even "larger halves" than from the fire or safety standpoint.

Another lesson which is taught by the quarter century's experience of Underwriters' Laboratories is that through cooperation are the best results secured. Cooperation is but a shorter way of saying that "you can lead a horse to water, but you can not make him drink." Without the cooperation of the public the most active efforts of regulatory authorities of any sort are at least half wasted as though upon the desert air. With cooperation all things can be accomplished. We have found, as no doubt you have, that the cooperation of the industries affected by our rules, regulations, specifications, and standards is most essential. That Underwriters' Laboratories now enjoy the most hearty cooperation of the multitude of industries in which it is active seems ample proof that it has learned this very important lesson well.

The standardization movement, in one phase of which you are vigorously concerned, is an all-important factor in our present civilization. Without some degree of standardization chaos would prevail. Standardization of the fundamental habits of thought of our citizenship is the aim of the Americanization movement of the day. The so-called "melting-pot" effect upon the immigrant to this land is but to say that the immigrants have become standardized in their belief of the inalienable right of men to "life, liberty, and the pursuit of happiness." But standardization must not go too far; our indi-

vidualities must be preserved. Imagine the dreariness of life if all automobiles were Model T's. Consider the hopelessness of the shaven head and gray and white stripes of the prison garb.

You must cooperate with the fire-prevention group in the standardization of the fundamentals for safety and accuracy in gasoline-pump design. You must, as has the fire-prevention group, recognize the inalienable rights of individuality. The fundamentals of safety in gasoline-pump design and—I believe I am correct—of accuracy as well, are storage underground and confinement during delivery.

Now, as to cooperation. Presumably most of you are familiar with the service of inspections at factories and labeling which is carried on by Underwriters' Laboratories at more than 1,500 factories in the United States and Canada. This label service manifests to the property owner, who is the customer of the insurance companies and of the manufacturer alike, to the architect and builder and to all inspection authorities, whether underwriting, municipal, State or Federal, that devices and products bearing labels are of standard design and construction, and when examined at factory were found suitable for the intended use. This service is now and for some years has been in active operation in the factories where more than 90 per cent of gasoline pumps and tanks are made. Trained inspectors employed by Underwriters' Laboratories are constantly in touch with the entire assembly and production program of each plant. The assistance of these men and of the supervisory staff at the Chicago office of the laboratories (of which I have charge) are offered to this conference in making effective the rules and regulations for accuracy of measurement which you may adopt. Labels of special design will be provided certifying not only to the acceptance from the safety or fire hazard standpoint but from the requirements for accuracy as well. Such labels would serve to you and to each of you in your individual jurisdictions as evidence that the manufacturer of the pumps had complied with joint regulations applying.

Providing such a service is attractive, I would point out that cooperation, true cooperation, involves something in return from you. It was without fear of contradiction that I stated some few moments ago that the " better and larger half " of the problem of safe and accurate service from gasoline pumps lay in their proper installation and maintenance after installation. This problem is a local one and is individual to each pump. Pumps made in Milwaukee may be installed in Philadelphia or in Denver. Pumps made in Fort Wayne or in Springfield or in Dayton are found installed from coast to coast. The factory inspection work can be concentrated within a few territories, the installation and maintenance inspection must be local and individual. If you, in supervising the installation and maintenance of pumps, which we have seen to it are safeguarded at factories, will watch out for the essentials of safety as well as for accuracy, then true conservation as well as true cooperation will be effected and saving at the spigot while wasting at the bunghole will be avoided.

In speaking of cooperation it is often understood that only two parties are involved. I have described a plan for cooperation in securing both accuracy and safety in the use of gasoline pumps. It is with great pleasure and satisfaction that I report an assurance of hearty cooperation in such a plan from the manufacturers of gasoline pumps now employing our label service. They will gladly submit

their product to our inspection for the labels of new and joint significance and will continue and extend to you assistance of their experts and of their distributing organizations in the installation and maintenance problem. In addition I feel safe in guaranteeing the largest possible measure of active assistance and cooperation from the thousands of insurance and fire protection engineers and inspectors already active in the safety work.

Mr. President and members of the conference, I have purposely refrained from seeming to suggest, in what I have said, views which I may or may not have, and which at any rate I should not have, as to how you should go about to define accuracy in pumps.

At the risk of repetition, I desire to impress upon you the necessity for keeping gasoline underground; the necessity for keeping it confined. Do not, in your very proper desire to see to it that the purchaser of gasoline gets every penny's worth that he pays for, allow it to occur that gasoline in bulk or in retail storage is exposed in any way; otherwise we shall have cities burning up and people destroyed, resulting in a waste of all the savings which you can accomplish through accurate, serviceable devices.

I thank you very much.

The CHAIRMAN. I am sure we all appreciate the word of caution that the last speaker has given us. We all know the extreme importance of measuring this commodity under conditions that are approved and safe.

In the discussion that is to follow I hope that the State representatives will see to it that the local representatives who are with them will give us the full benefit of their advice. We are going to get a great deal of information from the people who are actually engaged in the inspection and testing of these devices. The discussion is now open.

Mr. JOHNSON. Mr. Chairman, I beg to recommend that we proceed to item No. 10 on the program.

The CHAIRMAN. Do you make that as a motion? Is there a second?

(The motion being seconded, it was put to a vote and agreed to.)

The CHAIRMAN. We will proceed to the discussion of item No. 10 on the program, the "Report of the committee on specifications and tolerances." The chairman of the committee will present the report.

REPORT OF COMMITTEE ON SPECIFICATIONS AND TOLERANCES, PRESENTED BY F. S. HOLBROOK, CHAIRMAN.[5]

Mr. Chairman and gentlemen, your committee on specifications and tolerances respectfully submits the following report:

The undersigned were appointed to constitute the committee, replacing the old committee which has been visited by the death of one member, Mr. John C. Connors, and the resignation of another, Mr. L. A. Fischer, who was the chairman of the former committee. Mr. Fred P. Downing, who has retired from the weights and measures work, also resigned.

Immediately upon the appointment of this committee in March, 1920, an organization was effected, and it was decided that on account of the shortness of the time available before the present conference,

[5] For text of specifications and tolerances as finally adopted, see Appendix of this report.

specifications and tolerances for liquid measuring devices would be the only class of specifications and tolerances which could be considered by the committee.

At the last conference tentative specifications and tolerances for this class of apparatus had been adopted, with the understanding that these specifications and tolerances would be revised and finally adopted at this conference; and, consequently, at that time, members and manufacturers were urged especially to study the tentative specifications and tolerances and submit criticisms and constructive suggestions for the use of the committee. Because this opportunity was but little availed of, about April 14, 1920, the following letter was addressed to manufacturers of liquid-measuring devices in the United States and to all members of the conference on weights and measures:

DEAR SIR: 1. At the Twelfth Annual Conference on Weights and Measures, attention was given to the subject of liquid-measuring pumps and as a result specifications and tolerances were adopted by the conference. These are inclosed herewith. These were adopted tentatively only, and all members and manufacturers were requested to give them careful study and attention. Recommendations for amendments were solicited and these were to be submitted by members and manufacturers as soon as practicable in order that the committee on specifications and tolerances of the conference might have such material to guide and assist them in the preparation of a final report.

2. This committee is now functioning but comments have been received from very few members of the conference. Therefore this letter is written to call the above facts to your attention and urge you to promptly submit any material which will be of service, to the end that proper consideration may be given it.

3. It was planned that the committee would complete its report so that it might be forwarded to the delegates about a month before the conference. On account of the failure to submit the above-mentioned material and the late date at which the committee was appointed, it may be found impossible to pursue this course. However, the best possible progress will be made and the report issued at as early a date as possible.

This was followed by a letter addressed to all the pump companies and liquid-measuring device companies on our mailing list, and sent out under date of April 16. This letter cordially invited each company to have representatives present to attend the sessions, and also invited them to put pumps on exhibition. It further invited them to submit blue prints and other matter describing their products for the use of the committee.

A number of manufacturers specified their intention of exhibiting their liquid-measuring devices at this conference, but they have labored under the difficulty that you all know exists in regard to embargoes on express and freight and the enormous tie-up of freight in the yards. As a result, out of a large number of pumps which were promised to the conference only four or five have arrived. These are now installed at the north end of the west building. The committee would suggest that the delegates avail themselves of the opportunity to inspect these exhibits which have been installed at a considerable expense to the manufacturers of the devices, and at considerable expense for platforms, and so forth, to the Bureau of Standards. It is probable the consideration of the specifications and tolerances will not have been completed by noontime, and with these in mind the delegates will be able to inspect these exhibits and perhaps bring back some new ideas to the afternoon session.

A third letter was sent out about 10 days before the conference was to assemble which transmitted a tentative report of the committee on specifications and tolerances. The text of this letter of transmittal follows:

DEAR SIR: 1. At the twelfth annual conference on weights and measures there were tentatively adopted specifications and tolerances for liquid-measuring devices with the understanding that the committee on specifications and tolerances would carefully review the entire matter, consider all amendments and comments made by members and manufacturers, and recommend to the next conference specifications and tolerances for final action. The committee has been proceeding with this work and has now advanced it to a point where it is felt that a tentative report can usefully be issued for the information of the delegates.

2. A copy of this report is inclosed herewith. You will note that in some cases specifications have been reworded, while in others the committee at present believes no amendments in the tentative specifications are necessary. In one case a recommendation that a specification be deleted is made. In those instances where no decision has as yet been arrived at the specification is noted as having been reserved for further consideration.

3. It may be stated further that considerable rearrangement in the numbering of the specifications is planned by the committee in the interest of continuity and clarity.

4. We urge that you give this report your careful attention and familiarize yourself with the requirements proposed herein to the end that the specifications and tolerances as adopted by the conference may be fair and equitable to all concerned.

5. Before this subject is taken up at the conference, which will be on Tuesday morning, May 25, the committee plans to place in your hands a final report covering all its recommendations.

Yesterday, as you know, the final report was put into your hands in order that you might have the opportunity during the evening of considering it, to the end that the specifications might not be read at the conference for the first time, in which case many delegates would complain, and rightfully complain, that they were unable to prepare their comments upon them in time to present them on the floor.

This document, of which you all have a copy, is entitled "Final Report of Committee on Specifications and Tolerances to Thirteenth Annual Conference on Weights and Measures." That is the report which is to be considered here to-day.

Rewording of specifications has occurred in some cases, and in other cases it has been suggested that the committee has no comments to offer and no changes to recommend. In two cases it has been recommended that specifications be deleted. The order of the specifications has been rearranged in order that they may be presented in a more logical order than formerly, and in every case, for the assistance of the delegates, the new number and the old number of each specification is given so that there may be no doubt in the mind of anyone as to what specification is under discussion. Also, in each case, for the convenience of the delegates, the original wording is printed first and the suggested rewording follows immediately thereafter.

Respectfully submitted.

F. S. HOLBROOK,
CHARLES G. JOHNSON,
WILLIAM F. CLUETT,
Committee on Specifications and Tolerances, Annual Conference.

DISCUSSION OF SPECIFICATIONS AND TOLERANCES FOR LIQUID-MEASURING DEVICES.[6]

Mr. HOLBROOK. It seems that the best way to present this will be to read the specifications one by one and open them for discussion. In former conference it has been the practice to vote upon each specification after discussion, and finally to adopt in toto the various actions which have been taken upon the individual specifications.

I presume, if there is no objection, the reading of the report will continue at this time, beginning with specification No. 1.

The CHAIRMAN. Would it not save a little time if you simply call attention to the differences between the original and the suggested rewording. Most of the delegates have read this, and if you will simply take each specification in turn and say that the suggested rewording is different from the other in certain respects, would not that be sufficient, and avoid reading the details.

Mr. HOLBROOK. If it can be understood, with a copy of this in the hands of each delegate, that course may be followed very readily.

The CHAIRMAN. Suppose we try that. Just explain, if you will, the suggested rewording, and how it differs from the first.

Mr. HOLBROOK. Specification No. 1 contains a definition of the devices intended to be covered by the specifications. Last year the word "pump" was the basis of the definition. It has been found that whereas practically every device includes a pump, this pump is often not the most conspicuous part of the device, especially where the device is intended to deliver by gravity. The word "pump" has, therefore, been eliminated, and the definition has been reworded to read as follows:

A mechanically operated liquid-measuring device, hereinafter referred to as a liquid-measuring device, is a mechanism or machine adapted to measure and deliver liquid by volume.

I think as an addition to that specification, we might well say that "Such a device often consists of a pump or a pump in combination with other mechanism."

The CHAIRMAN. Is there anyone who offers objection or wishes to make suggestions in regard to the suggested wording? [After a pause.] If not, the Chair considers that there is no objection to the adoption of this No. 1, and it is so ordered.

Will you explain the differences in Nos. 2, 3, and 4, Mr. Holbrook?

Mr. HOLBROOK. In the tentative specifications there was a specification, No. 2, which, in two parts, was intended to define "permanence." In the opinion of the committee that specification was so broad as to include several distinct thoughts and, therefore, in rewriting the specification the committee split it into three parts, the first of which is headed "Permanence," the second "Plumb and level conditions," and the third, "Means required to determine level."

The suggested rewording of new No. 2, headed "Permanence," is, I believe, identical with the old specification No. 2 in regard to the same subject. The main change in No. 3, "Plumb and level conditions," is the addition which requires:

All liquid-measuring devices shall be installed plumb and level and their installation shall be of such strength and rigidity as to maintain this condition.

[6] For text of specifications and tolerances as finally adopted, see Appendix of this report.

The requirement that these pumps be installed plumb and level was to be inferred from the old specification, but it did not mandatorily require it.

A considerable change has now been made in the specification regarding the means required to determine level. Under the wording, as adopted last year, every pump was required to be equipped with a two-way or a circular level, or leveling lugs, or a plumb bob to establish the level of the instrument. Now, it has been suggested by the makers of a number of liquid-measuring devices that their devices are not affected by any ordinary changes in level, that they will deliver accurate measure when installed exactly level, and that they will continue to deliver accurate measure when the device is installed considerably out of true. Such manufacturers urge that, if their devices will deliver accurate amounts when installed in any position in which it is reasonably to be expected that they may be installed, to require a level on such a device is to require an unnecessary refinement. In that respect the committee agrees with them. A level, we believe, should be provided upon all pumps the accuracy of which is affected by slight out-of-level conditions. However, if the out-of-level condition has to be such that it would shock the conscience of the installation man to install it in such a way, then leveling devices are no longer to be required for inaccuracies resulting from such position. Therefore the committee has required leveling devices only upon such pumps as are affected to the extent of—

One-half the tolerance allowed when set in any position on a surface making an angle of 5 per cent or approximately 3 degrees with the horizontal.

For those pumps which are inaccurate within the 5 per cent range levels must be provided. In the case of those pumps which do not become inaccurate by more than half the tolerance until after that tilt is exceeded then no leveling device is required. That conforms very closely with a similar specification for scales. A level is required upon such scales as may not be set out of level by slight amounts without affecting the accuracy of the instrument.

The Chairman. You have heard the explanation in regard to the new numbers, 2, 3, and 4. Are there any objections to the new form?

Mr. Ramsdell (representing Gilbert & Barker Manufacturing Co). Mr. President, if I am not out of order, I would like to inquire just exactly what is meant by No. 4. Does it mean that a device is to be provided on the instrument for determining the level? Do I understand the leveling instrument itself must be made a part of the device, or may it be furnished as a separate instrument or provided by the user? I have in mind our own product. I am representing the Gilbert & Barker Manufacturing Co. in asking this question, and it is quite possible on a visible pump, which we are building, to determine very readily whether it is absolutely level or not without the use of an instrument. We have a line etched on the glass which will determine at once whether the pump is in level or out of level. Will that comply with this specification?

Mr. Holbrook. Any proper means which will show whether or not the device is in level will be satisfactory. The specification does not require a level bubble or a two-way level, so called. Machined lugs, across which an ordinary carpenter's level could be set in two directions, would comply with the specification. Now, Mr. Ramsdell,

I would like to ask you: Is the liquid to be delivered by the pump itself, when contained, for instance, in a visible chamber, used to establish the level of the pump?

Mr. RAMSDELL. It could be very readily in our type of pump. We have a graduated scale made up of a series of lines, one above the other, and if that line is true and the liquid conforms to it, the pump is in level. We also have a shelf just beneath the visible container to which a spirit level may be applied in all directions. So it may be leveled not only by the liquid which the container holds but also by means of applying a level to this shelf which I have just described at the base of the container.

Mr. HOLBROOK. If that shelf indicates level when the pump is in level, and is not so rough that a level can not be established on it, that shelf would meet the specification. There would be no objection to establishing the level with liquid, except that it is my impression that gasoline pumps are usually installed in their final position before any gasoline is drawn into them from the underground tank. Merely to be able to find out that your pump was out of level after installation would be rather an unhappy solution, because the level should be established before the final position of the pump is determined. Unless it were possible to draw liquid into the pump with safety from an underground container before the final position of the pump is established, a level determined by means of the liquid drawn from the underground tank would come too late to save it.

Mr. NEALE. Did I understand that that mark is all around the measuring container or just on one side?

Mr. RAMSDELL. Our visible container is not built of glass throughout. It contains four windows that are, roughly, 2½ inches in width. These windows face in four different directions, and it is across this glass that we mark horizontally the graduated scale. It had occurred to me that that might be used as a means of determining whether the pump is in level. If that is not satisfactory, we have this shelf that I have described, which is machined, and to which a spirit level may be applied all around, and the position of the instrument determined.

Mr. HOLBROOK. It seems to me that if the shelf is in level when the pump is in level, the machine will comply with this specification.

The CHAIRMAN. You have heard these comments. If there are no further objections, we will consider the specifications Nos. 2, 3, and 4 adopted. [After a pause.] It is so ordered.

Will you read No. 5?

Mr. HOLBROOK. Specification No. 5 refers to "units of delivery," and requires that—

> Liquid-measuring devices shall have the following discharge capacities per stroke or cycle, and these only: One gallon, a multiple of the gallon, or a binary submultiple of the gallon.

In relation to those particular capacities, I may say they are the same capacities which have been adopted in the past for liquid measures.

No change occurs in this specification except that devices delivering predetermined amounts corresponding to predetermined prices at a definite price per gallon are not at this point required to show

the amount actually delivered to the customer. These words were deleted here. Inasmuch as there is a general specification requiring that in all pumps the delivery must be indicated, to include the words here would be tautological.

The specification also requires that the price per gallon at which the device is set must be clearly indicated by automatic means. In the use of these devices it has been found that one price per gallon will be advertised on the pump and, whether intentionally or by inadvertence, the pump will actually be set to deliver amounts at other prices per gallon. Moreover, a card showing the price per gallon may be inserted and allowed to stand and the fluctuating prices of gasoline may cause the operator to change the deliveries from time to time, but without changing the price per gallon which is announced on the pump.

Now, these devices are intended to be installed at wayside stations, and the main purpose of them is that an operator will not be required to be at the pump at all. If an operator is not there to answer questions, there should be every opportunity given to the purchaser to know how much he is going to receive before he deposits his coin in the slot, because if he has to deposit his coin in the slot in order to find out, it is too late to repent of his bargain. Therefore this requires that by some automatic means the customer be enabled to check the setting established by the seller of the gasoline. It merely requires that the purchaser know definitely what price per gallon he is paying for his commodity before he makes his bargain with the pump by dropping his coin in the slot.

Mr. Small. Mr. President, may I have the privilege of commenting upon this section of the report?

The Chairman. You may.

Mr. Small. The chairman of this committee has suggested that this last section of new No. 5 applies particularly in the case of coin-slot machines, and that those machines may be used when no attendant is present.

There is nothing in this specification anywhere, Mr. President, to indicate that they are to be limited in their application to pumps for the delivery of gasoline. I assume that the committee has in mind pumps for the delivery or sale of other materials. It is perfectly proper, I have no doubt, that pumps shall deliver liquids of one kind or another without the attendance of an operator. I respectfully submit that under no consideration should it be permitted by inference from this specification or from any publication from this conference that gasoline may under any conditions be delivered to an automobile without the attendance of a qualified operator. If it were possible to amend this specification to cover that point, I should like very much to see it done.

Mr. Barnard. May I ask the speaker what his objection is to that? Define your objection, please.

Mr. Small. I can assume, Mr. President, that some boy will go and drop a coin in the slot just to see the gasoline run out. I can assume some one will get 2 or 3 or 5 gallons and lug it down the street in a can. We should not allow this material, gasoline, to be handled in any such manner without the attendance of an operator; otherwise your fire hazard is obviously an extreme one.

Mr. JOHNSON. There is at the present time absolutely no restriction placed upon the sale of this commodity, and as Mr. Small's objection is confined to problematical conditions, I do not think it is well taken. These conditions are available to-day even in the best and most elaborately constructed apparatus, attended by the most competent operator. A small boy could purchase a quart of gasoline, or any amount of gasoline, and a woman could do the same thing, for any purpose, in a can or pail, so I do not believe Mr. Small's objection is of any importance.

The CHAIRMAN. Are we not getting over into the question of safety? Do we want to go into the safety regulations? It is very important, of course, but it has nothing to do with the accuracy of the measuring device. It seems to me proper to consider this from the standpoint of measuring devices, and then afterwards, if necessary, we can take up the question of safety. Mr. Small, of course, is interested in the safety subject, as he should be.

Mr. BARNARD. That is what I was going to submit, that I thought that was a matter of safety. It is possible for a small boy or anyone else to go to any pump standing by the roadside—the operator might be some distance away—and pump out a half gallon and spill it on the ground. That is a matter of safety, in my judgment. I think that matter should be taken up in a separate specification and not in every one of these individual specifications as they come up.

Mr. RAMSDELL. Are we to understand that No. 5 applies to vending machines only?

The CHAIRMAN. No; I do not so understand it.

Mr. HOLBROOK. The proviso applies to vending machines only, but the body of the specification applies to all pumps.

Mr. SMITH. It seems to me that it is the intention of the committee to have this indication of price at which the machine is set conspicuous to the customer. It might be well to include the words "to the customer" after the word "indicated," in the last line but one of the specification, making it read in this manner:

> But in such cases the device shall be so constructed that the price per gallon at which it is set at any time must be clearly indicated to the customer by automatic means.

I think it would be plainer if that amendment was made.

Mr. HOLBROOK. The committee has no objection to that amendment.

The CHAIRMAN. If there are no other remarks, the Chair will consider that specification No. 5 is adopted as amended. [After a pause.] The next is specifications Nos. 6 and 7. I will state if at any time there is any question you can call for a vote. I am simply trying to save time.

Mr. HOLBROOK. In relation to specifications Nos. 6 and 7, in view of the fact that very considerable comment is liable to be made upon these, I would in this case like to read both the old and the new specifications with running comments thereon. Original specification No. 7 provided that—

> All liquid-measuring pumps of whatever type used in retail trade shall be so designed, constructed, and graduated that their indications can be read or their discharge readily determined within an amount which is not greater than the value of the tolerance as hereinafter provided.

That specification was very frequently misunderstood, and a careful study of the wording will demonstrate that the misunderstanding was justifiable. The specification was not written to impose upon the manufacturers all that they assumed might be imposed under its provisions. In a brief submitted by a number of manufacturers that specification is treated in the following way:

A recommendation is made that the specification be stricken out on account of the following reasons:

> We recommend that this requirement be stricken out because of the extreme sensitiveness of an instrument required to show on a graduated scale an amount within the tolerance and make necessary correction for parallax.
>
> Furthermore, it is our opinion that the accuracy of the pump is not determined by these indications, but rather by sealed positive quantity stops.

So much for old specification No. 7 and the recommendations made in regard to it. Old specification No. 27 read as follows:

> In all gauge-glass or float gauge types of liquid-measuring pumps which have a graduated scale as the sole means of determining the amount of liquid discharged, the length on the scale equivalent to the tolerance at any point must be readily appreciable when the character of the indicator and normal distance from the observer's eye is taken into consideration, and in no case shall this length be less than 0.04 inch.

Now, it is immediately apparent to all of you that old specification No. 27 is distinctly a proposition of sensitiveness, and therefore that old No. 7 and old No. 27 ought by their very nature to be considered together. Therefore the committee, with due regard to all comments made thereon, have amalgamated specification No. 7 and specification No. 27, and also specification No. 8–a. The suggested rewording is:

> *Indication of Delivery Required.*—All liquid-measuring devices shall be so designed and constructed that the amount delivered will be clearly and definitely indicated by automatic means, and the indication of any delivery shall take place only when the full discharge has in fact occurred.

That, so far, has been required by the old specifications, and I think that these regulations may be defined as very reasonable ones, merely requiring, as they do, that the customer be informed by the instrument as to the amount which the instrument has delivered after the full discharge has been completed. Now, specification, new number 7, covering sensitiveness——

Mr. Ramsdell. May I interrupt you there just a moment on that section which you have just read? We of the industry would like to bring to your attention the question of piston-rod displacement. I believe most of us, if not all of us, provide on our pumps an indicator that indicates the discharge at the top of the stroke, but, as a matter of fact, the measurement is not complete until the piston has been returned to zero. During that downward stroke we get what we call the piston-rod displacement. We roughly figure that to be something within the tolerance, but we thought we would like to bring that to your attention this morning for a ruling from you in regard to it. We do not like to entertain any idea of change in the design of the pump; still we want to bring to your attention the fact that the delivery is not completed absolutely until the piston has been returned to zero, and we were a little bit puzzled as to just what might be meant by the words, beginning with the third line, "by automatic means." If you will kindly straighten us out on that

point and give us your ruling on the piston-rod displacement, we will be very much obliged to you.

Mr. Holbrook. The piston-rod displacement is a hard nut to crack. It is true that on every device which has a graduated scale and a piston the delivery is not completed until the pump has been stroked up and then stroked back to zero, and a graduated scale, perhaps necessarily, indicates that the full amount has been delivered when the stroke has reached its highest point, and before the stroke back, resulting in the dribble flow, has occurred. I think that the dribble flow is usually within tolerance. In a good many types, with a five-eighths-inch rod, which I believe is common, the dribble flow amounts on a 5-gallon stroke to perhaps 6 or 8 cubic inches. Is not that correct?

Mr. Ramsdell. We figured one last evening, an eleven-sixteenths piston rod—and I think that is about what most are using now—and it figured on a 24-inch stroke about eight and a small fraction cubic inches on 5 gallons.

Mr. Holbrook. That checks my figure, because I used a slightly smaller rod.

Now, the problem of the dribble flow is certainly not solved by a straight vertical scale, which indicates that 5 gallons, or the capacity of the pump, has been delivered when the stroke has reached the top and when it is not indicated in some way by the pump that the piston is to be returned to zero. The committee has been cognizant of that, but has not found a solution for it, although I believe that there are some devices on the market which now require the complete up-and-down stroke before the registration on a counter, but that still does not save the graduated-scale registration. It seems that a great many of the delegates are especially interested in this dribble flow, and we would be glad to hear if anyone has a solution for it.

Mr. Barnard. Mr. Chairman, I think our friend from Minnesota, Mr. Neale, has some very decided opinions on that subject, and I would like to hear him express himself upon the floor of the convention.

Mr. Neale. We have not solved the problem of piston-rod displacement, but it does seem to me in the suggested rewording that if that language, beginning in the second line, after the word "means," were to be followed to the letter, it would in fact bar all perpendicular arrangements of scales. Following that language, that condition can never be met. We will have yet to deal with displacement. It seems to me we could still preserve that perpendicular scale if the committee could arrange to have an additional clause providing that the size of the piston rod be held within a certain degree, so that some manufacturer will not come along later and to suit some fancy of his own produce a piston rod an inch in diameter, for instance. These last two lines of that wording surely would bar the familiar perpendicular scale with parallel graduation. It seems to me that possibly a clause could be added to the effect that the piston-rod diameter of any type would be limited so its displacement did not exceed half the allowable tolerance, for instance, on a given stroke.

Mr. Irvine. Would it not be impossible, or practically impossible, to operate a pump if a piston rod were increased to an inch in diameter? Would not the friction be so great as to make it inoperative?

The Chairman. No; but it seems to me there is a suggestion which could be made, and that is that the piston rod could be made of tubing and hollow. That would not have much displacement. After all, what is going to happen if you do not complete the downward stroke? It is not the gasoline vendor that gets that; it is the next customer that comes along. So, it seems to me, if the man who sells it is not going to get the advantage of it, he is not going to do that thing; but the graduations ought to indicate what the thing is going to deliver. It means that the graduation represents that there is now in the receiver a gallon, or whatever it is. The graduation is there to tell what is to be delivered.

Mr. Schoenthal. Your statement would be true if it were not for the fact that the operator of the pump, by not returning his pump to zero, could often drain the hose after the customer leaves the pump.

The Chairman. That would be possible. Certainly it would be possible, would it not—I ask some of the makers—to make the piston rod hollow, and its displacement could be made very small?

Mr. Frary. Mr. Chairman, in considering the last two lines, "and the indication of any delivery shall take place only when the full discharge has in fact occurred," it just occurs to me, how would this apply to a visible machine? For instance, if the purchaser is asking for 5 gallons, the indication of 5 gallons takes place before any discharge has been made. What does "full discharge" apply to there? Does it refer to the discharge into the customer's receiver or discharge into the measuring device of the instrument?

The Chairman. The measuring device of the instrument, I believe.

Mr. Holbrook. I think that the indication of the delivery in that case is not the showing of 5 gallons, or whatever amount is in the container, but the decrease of the amount to the point where the pump is empty. Obviously there is no indication of discharge until discharge is occurring. I think that a zero at the top of the scale merely shows that nothing has been discharged, and that when the liquid starts to fall in the glass container and passes the 1 gallon point it indicates the discharge of 1 gallon; and it indicates similarly the discharge of 2 or 4 or 5 gallons, or any number of gallons up to the capacity of the device.

Mr. Norris (representing the National Meter Co.). This discussion on this matter has been of great interest to me. We have developed a meter for measuring gasoline that will show the exact amount of gasoline passed, and it would be entirely independent of the pump. This could be attached on the tank and the actual amount passed be registered on the dial face of the meter. I should be glad to have you gentlemen look at my meter at noontime, and I will show you what we have there.

The Chairman. The other gentlemen might say that if the capacity of the cylinder is properly registered it would be a test on your meter. Each one might say that the other is a test.

Mr. Norris. Yes, sir; but it will win against the pump every time.

Mr. HOLBROOK. The sentiment of the conference, perhaps, might be expressed in this specification by exempting the dribble flow, if, in the opinion of the conference, the dribble flow should be exempted, by saying:

Provided, however, that this shall not apply to the additional flow resulting from the displacement of the piston rod during the return of the stroke to the zero point—

or something of that sort; and with an additional proviso, perhaps, that a clear and unmistakable statement should be placed on the pump to the effect that the registered indications are not, in fact, correct until the piston had been returned to its zero position. The dribble flow in the case of a piston-type pump, when used in connection with the graduated scale, is one of the hardest nuts to crack, I believe, in all specifications upon liquid-measuring pumps, and I merely suggest something which may properly protect a purchaser to the extent of the 6 or 8 or 9 cubic inches which result while the piston is being returned to its initial position. Is there any comment upon that suggestion?

Mr. NEALE. It seems to me, acting upon Mr. Holbrook's suggestion, it would be well to leave off all after the word "means," and stop right there. The rest is not involved. After the word "means," do not open up the question any further.

Mr. HOLBROOK. Yes; but Mr. Neale, if we stopped at "means," we still require that it shall be clearly and definitely indicated by automatic means, and in our opinion that still does not take care of the dribble flow, because certainly if a pointer reaches the 5-gallon mark, and 5 gallons has not been delivered, it has not been properly indicated by automatic means. I do not believe you can dodge the question.

Mr. NEALE. If the first part is ambiguous, then the second does not help any.

Mr. HOLBROOK. The second part helps to this extent, that very often we have a counter at the top of the pump which purports to indicate when the stroke has been completed, and if that counter is incorrectly set it may conceivably operate while you are still, if you please, an inch or a half an inch from the top of the scale. It would be perfectly possible in that case to run the piston up to an incorrect point where the counter indicated and immediately start to reverse the stroke, in which case you would get the dribble flow, it is true, but you might lose an inch or half an inch from the top of the cylinder. Those words were included to meet that circumstance. I think the dribble flow must not be disregarded, for the dribble flow comes under the first part of the specification, and by cutting out the last part of the specification you allow a fraudulent device to be installed. Perhaps this would not be done by the manufacturer, but the indication of the counter could readily be changed by the operator of the pump.

Mr. REICHMANN. Mr. Chairman, I think what the chairman of the committee has stated is true, that it is a knotty problem, and apparently the manufacturers have not solved it. It is a hard nut, and I do not think many of the delegates have given that particular feature of it much consideration, as much as they might have given it. Would it not be well to put that particular specification over to the

next conference, asking the committee on tolerances and the manufacturers, as well as the sealers, to put a good deal of thought on that, so it can be finally settled at the next conference? From reading over these specifications last night that is one specification that seemed to me to be an awfully hard one.

Mr. Holbrook. Dr. Reichmann, it occurs to me that a delay of a year is not necessary to include a proviso which may contain a half a dozen or a dozen words.

Mr. Reichmann. Will the proviso solve the problem? If it will, well and good.

Mr. Holbrook. This dribble flow is a matter which everybody, so far as I know, has been entirely cognizant of for the last three or four years, and I think a good many of the delegates have put, and I know all of the manufacturers have put, a great deal of thought on the matter. Perhaps, instead of saying that we postpone consideration of the specification for a year, something might be thrashed out in time for this afternoon's or to-morrow's session. That would solve the problem just as well as we ever can solve it, because we know the difficulty which we are encountering now just as well as we ever will know it.

Mr. Reichmann. Why not put it over until to-morrow morning for the proper wording of that instead of this afternoon?

Mr. Bean (representing Wayne Oil Tank & Pump Co.). I was just going to propose a very similar proviso at the time you suggested it. I believe it would be readily accepted by the industry, and I believe by most of the delegates. I think the industry is very anxious to see these specifications entirely completed this year if possible.

The Chairman. If there is no objection, the further consideration of this particular paragraph will be deferred to some time later in the meeting. We will leave it to the committee to bring it up at the opportune time. With reference to No. 6, have you any explanations?

Mr. Holbrook. I have no further explanations on No. 6.

The Chairman. Is there any objection to No. 7, or have you any explanations to make on No. 7?

Mr. Holbrook. Yes; I think there are some very necessary explanations on No. 7. No. 7 is a new specification in regard to sensitiveness. Once again, I would like to call attention to the misunderstandings which have occurred in reference to this specification. The old specification did not intend to require that an amount within the tolerance be shown on a graduated scale, when, in addition to the graduated scale, there were positive stops provided. Therefore, we think the manufacturers' criticism that extreme sensitiveness of all instruments required to show on a graduated scale the amount within the tolerance, when it is understood that the accuracy of the pump is not determined by these indications, but rather by sealed quantity stops, is entirely well taken. With that in mind, the specification has been reworded to read as follows:

All liquid-measuring devices shall be so designed and constructed that they can readily be operated to deliver each quantity for which a graduation, stop, overflow pipe, or other indicating means is provided, within the tolerance on such amount hereinafter provided.

Now, as worded, that allows a pump with sealed quantity stops that will indicate to the purchaser the amount received, and which will deliver within the tolerance when operated so that a stop or overflow pipe is used, to be acceptable without the accuracy upon the graduated scale which would otherwise be required. Moreover, this specification, we think, is not susceptible of the misinterpretation that it must show within the tolerance quantities of liquid which the pump is not essentially designed to deliver. It was urged against the old specification that if a man conceivably called for seven-sixteenths of a gallon of gasoline, then that seven-sixteenths of a gallon must be registered within the tolerance on seven-sixteenths of a gallon. Leaving out the fact of whether that was a reasonable interpretation of the specification or not, we may say that the specification was never written with that in mind. You will note in the present specification that only those amounts are required to be delivered within the tolerance for which a graduation, stop, overflow pipe, or other indicating means is provided. In other words, the manufacturer in building his pump will indicate by its construction that his pump is designed to deliver certain amounts, and for each amount for which he provides a graduation, or a stop, or other indicating means the tolerance must be met. But for amounts which the pump is manifestly not designed to deliver, no delivery of such amounts within the tolerance is required.

Now, to continue with sensitiveness, and include the idea of old specification No. 27, the following wording has been adopted:

This specification shall be construed to require that in the case of all devices which have a graduated scale or dial or similar indicating means as the sole means of determining the amount of liquid discharged—

In other words, a pump without a definite stop or overflow pipe—

the length on the scale or dial equivalent to the tolerance at any graduation must be readily appreciable when the character of the indicating element and its normal distance from and position in reference to the observer's eye are taken into consideration, and in no case shall this length be less than 0.04 inch.

The next sentence is still ambiguous, and we would suggest that it be read as follows. It will be rather long, but it will cover, perhaps, the conditions.

If the graduations on the scale or dial are equally spaced and the delivery chamber is of the same cross section throughout its length, this specification requires a minimum length on the scale or dial of 4.6 inches per measured gallon. The maximum cross sectional area of the measuring chamber at the gallon point must be 50 square inches; if cylindrical, the maximum diameter must be 8 inches.

The reason we have added the additional elements at the beginning is this: That occasionally pumps are constructed in which some deliveries are defined by stops, and other deliveries are defined by the graduated scale. Now, the intention of this specification is to require that a pump be able to deliver any amount which it is designed to deliver to an accuracy within the tolerance. In the opinion of the committee, and in the last year's opinion of the conference, ordinarily 0.04 of an inch separation of two reading elements is discernible, and less than 0.04 of an inch is very likely to pass unnoticed. Therefore the length on the scale equivalent to the tolerance at any point is required to be 0.04 of an inch. Any graduation must show the toler-

ance to a degree represented in vertical height by 0.04 of an inch. Now, if on the 1-gallon mark it is necessary to set the indicator—no stops being provided—to within 0.04 of an inch in order to show 2 cubic inches, it will require a measuring chamber of a diameter of 8 inches, and it will require a length for that first gallon of 4.6 inches. However, on 2 or 3 or 4 or 5 gallons only an equal sensitiveness is necessary. In other words, at the 3-gallon point, for instance, it is sufficient if the tolerance at that point, which is 6 cubic inches, is represented by a vertical height of 0.04 of an inch. Therefore, if a manufacturer constructs a device which does not depend at the gallon point upon the graduated scale, all that he is required to show is 0.04 inch in vertical height for the tolerance at the first graduation which must be depended upon. Now, I find that rather a hard thing to explain; but if it is not clear, we can go into examples. But, at any rate, I think the language covers it. In case the gallon is the first graduation, and in case no stop is provided at the gallon, and the graduations are equally spaced, and the measuring chamber is the same cross-section throughout its length, then under those conditions the maximum diameter is specified as 8 inches and the minimum height of the first gallon on the vertical scale is specified as 4.6 inches.

Mr. Neale. Mr. Chairman, would that anticipate that such a device would not be usable under 1 gallon?

Mr. Holbrook. It is the opinion of the committee that a measuring pump holds itself out to deliver this first graduation within tolerance; otherwise there is no excuse for putting such a graduation on it. There is no limit to the fineness with which a graduated scale may be made, Mr. Neale. The committee considers it a reasonable requirement that the first graduation on the pump be capable of being delivered within the tolerance provided by the conference, since if such delivery can not be made within such tolerance your tolerance upon small amounts means nothing.

Mr. Neale. That means really that your tolerance requires that 1 gallon corresponds to 4.6 inches. In other words, the wording of that is to be interpreted similar to the tolerance on a scale, for instance. Is that right? Take the tolerance, for instance, on a 10-pound spring-dial scale; the tolerance is fixed as the tolerance on the 10-pound scale for the complete revolution, and this is on a basis of a gallon, equivalent to 4.6 inches.

Mr. Holbrook. I confess I do not follow you. The tolerance is fixed upon the graduations of the pump. If a pump is designed to deliver a quart it must be able to deliver a quart within the tolerance. If it is designed to deliver a gallon for its smallest delivery, then the pump must be capable only of delivery within the tolerance on the gallon, because the pump does not hold itself out as being able to deliver less than a gallon of liquid accurately. Anybody who uses the pump for less than a gallon will be misusing a device which has been put into his hands to measure quantities of 1 gallon or in excess of 1 gallon, but not quantities less than 1 gallon.

Mr. Ramsdell. You do not require, as I understand it, a quantity stop for each graduation shown on that scale. That is, if we have a 5-gallon scale and a graduation for each gallon, a quantity stop is not required for each gallon. Am I correct in that?

Mr. Holbrook. Your quantity stops are not required at any gallon mark, provided you have a scale and pointer which under the terms of this specification will deliver the amount desired within tolerance.

Mr. Ramsdell. I understand that; but suppose that the spacing between the gallons, on account of the size of the cylinder, is less than 4.6 inches. Are we then required to have a quantity stop for each graduation on the scale? Do I make myself clear?

Mr. Holbrook. Let us figure it on the first gallon. In case the first gallon has no quantity stop, the length representing the first gallon must be at least 4.6 inches. However, a scale like this [drawing a scale on the blackboard; see fig. 1] is allowable under the specifications. On this scale [indicating] this represents the first gallon, this represents the second gallon, this the third, this the fourth, this the fifth gallon, for the reason that you must have 0.04 of an inch in vertical height for the tolerance at each point. In other words, 0.04 of an inch in vertical height must equal 2 cubic inches here. [Indicating the first gallon graduation.] At this point 0.04 of an inch in vertical height may equal 10 cubic inches. [Indicating the 5-gallon graduation.] You are sufficiently sensitive up here, because you were equally sensitive up here and down here. [Indicating 5-gallon and 1-gallon graduations.] If your graduations on this scale are equally spaced, the tolerance on 5 gallons being five times the tolerance on 1 gallon, the vertical heights corresponding will be in the same proportion, and your apparatus is five times as sensitive up here as it is down here, which is not absolutely required.

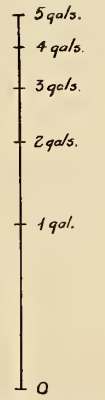

Fig. 1.—Scale having equal sensitiveness at each graduation.

Mr. Ramsdell. Suppose we have a scale marked for 5 gallons, a graduation for each gallon equally spaced, as they would be on a cylinder where the diameter is uniform throughout, and let us suppose, for the sake of argument, that that spacing is less than 4.6 inches to the gallon. Are we required to have a quantity stop on each gallon as we go up the scale, at each mark shown on that scale?

Mr. Holbrook. No; it is perfectly possible that upon such a device as you mention, a quantity stop would only be required at the first gallon. If there is no quantity stop at 1 gallon, 0.04 of an inch is required to represent 2 cubic inches, and the height of the scale must be 4.6 inches per gallon. However, if a quantity stop is provided at 1 gallon, and there is no graduation between 1 gallon and zero, and no other graduation until the 2-gallon point is reached, then at the 2-gallon point reference to the scale must be made if there is no quantity stop there. At the 2-gallon point the tolerance is 4 cubic inches; 2 cubic inches may represent 0.02 of an inch in vertical height. Therefore upon such a scale, when the gallons only are graduated and there is a stop at the first gallon, it will be satisfactory if the vertical height per gallon is 2.3 inches. Have I expressed that idea?

Mr. Ramsdell. I think so. It was not quite clear here and my effort has been to draw out a statement from you, so these specifications may not only be understood by the industry but by the sealers.

If we had a cylinder that would give a spacing of $2\frac{1}{2}$ inches to the gallon, or 3 inches to the gallon, as we go up, the question I had in mind was would we be required to have a quantity stop at each gallon, or would you be satisfied with a quantity stop at the 1 gallon only?

Mr. Holbrook. Yes. In case your length per gallon is not less than 2.3 inches and there is a quantity stop at the gallon point—always considering that a proper pointer is used, and there is a lack of parallax, etc., which is considered in other specifications—then no quantity stop will be required at or above the 2-gallon point. Of course, if the length on the graduated scale is 2 inches per gallon, you would require quantity stops at all graduations below the 3-gallon mark, because at 2 gallons the tolerance still would not represent on the vertical scale 0.04 of an inch.

We may proceed in either of two ways. We can delete the sentence starting with the words, "If the graduations on the scale or dial are equally spaced," etc. Nothing is sacrificed by the deletion of that part of the specification because that is just an example of what is required. However, we would like to retain those figures inasmuch as it does not necessitate every man doing his own figuring. So, if we read:

> That 1 gallon is the smallest amount which the device is designed to deliver, and if in addition there is no stop or overflow pipe or other automatic means of stopping the delivery provided at the 1-gallon point, then if the graduations on the scale are equally spaced and the delivery chamber is of the same cross section throughout its length, this specification requires a minimum length on the scale or dial of 4.6 inches per measured gallon. The maximum cross-sectional area of the measuring chamber at the gallon point must be 50 square inches; if cylindrical the maximum diameter must be 8 inches.

The last sentence reads exactly the same as at present with the addition of the proviso that the gallon is the first graduation, and there is no stop at the gallon point.

Mr. Neale. Mr. Holbrook, that last part there—I am just asking for information—it is just simply calculating the first part?

Mr. Holbrook. Calculating the first part absolutely.

Mr. Neale. Would it not answer the whole specification if you worded it beginning at that paragraph,

> This specification—

Of course, I have not a copy of the other before me—

> This specification shall be construed to require that in the case of all devices which have a graduated scale or dial, or similar indicating means, as the sole means of determining the amount of liquid discharged, the length on the scale or dial equivalent to 1 gallon shall be 4.6 inches.

Mr. Holbrook. You have not put in any provisos. I do not think that would cover it at all, because it is not required to be 4.6 inches if there is a quantity stop, and moreover, we must consider cases where there are some graduations which are defined by quantity stops and therefore the graduation is not depended upon for accuracy, but at other points no quantity stops are provided, and therefore the graduation is the sole means of determining the delivery.

Mr. Neale. Then, you do not intend this to be analogous at all to the specification, for instance, for devices like cylinder scales or analogous to the cases——

Mr. HOLBROOK. No; because in nearly all of those scales you have in mind the graduations are equally spaced. There is no requirement in this that graduations be equally spaced.

Mr. NEALE. When they are equally spaced it would be an analogous case.

Mr. HOLBROOK. And when these other conditions are met, for instance, I know of no scale in which you read the graduations of the scale above 3 pounds, and the 1 pound and 2 pounds are weighed automatically or weighed in a predetermined manner. Here sometimes 1 gallon is predetermined, and the scale is depended upon at points above 1 gallon. We have no similar instance of scales so built. In that respect it is not at all analogous to a scale.

The CHAIRMAN. It seems to me we have two points here: One is that the committee has endeavored to fix tolerances of some kind, which is all right. Then, down toward the end, where you begin with "if," about six lines from the bottom, you mean it for an example?

Mr. HOLBROOK. Yes.

The CHAIRMAN. You begin it, "For example, if the delivery chamber is of the same cross section," etc.

Now, I understand that the photographer is ready, and lunch will be ready at 12.45. Now, would it not be well, Mr. Holbrook, to defer six as well as this one and report on Nos. 6 and 7 at the same time?

Mr. HOLBROOK. I do not believe that is necessary, Dr. Stratton, because they do not depend upon each other in any way.

The CHAIRMAN. Is there any objection to the new No. 7 as now proposed? If not, the Chair will understand that—Mr. Reichmann

Mr. REICHMAN. That is the new No. 7 as read?

The CHAIRMAN. As modified by the chairman of the committee.

Mr. REICHMANN. I believe the only objection that has been raised—I personally can not get the committee's point of view on that at all.

Mr. HOLBROOK. If that is the case, we might adjourn now.

The CHAIRMAN. We will ask the chairman of the committee to write this out.

Mr. REICHMANN. If he will write that out so we can have it before us and look at it, I think it will simplify matters.

Mr. HOLBROOK. We do not want to do anything in the dark. We want you to understand what you are voting on.

Mr. REICHMANN. We do not understand that yet.

The CHAIRMAN. We will ask the committee to rewrite this, and it is barely possible they can get together and give us a recommendation on No. 6 as well. The consideration of No. 7 and possibly No. 6 will be the first thing after lunch.

APPOINTMENT OF COMMITTEES.

The CHAIRMAN. I have been asked to appoint a committee on resolutions at this time so they can be ready to report later. I will appoint Mr. Mote, of Ohio; Mr. White, of New York; Mr. Meredith, of Massachusetts; Mr. Dinsmore, of Nevada; and Mr. Smith, of Wisconsin.

I will also appoint as the committee on nominations the following members: Mr. Cluett, of Illinois; Mr. Richardson, of Virginia; Mr. White, of New York; Mr. Irvine, of Utah; and Mr. Fuller, of California.

I will ask you to meet here promptly at 2 o'clock. There is a good deal to be done. The hour was put at 1.30 o'clock, but probably we can not get back by that time.

(Thereupon, at 12.30 o'clock p. m., a recess was taken until 2 o'clock p. m.)

FOURTH SESSION (AFTERNOON OF TUESDAY, MAY 25, 1920).

The conference reassembled at 2.30 o'clock p. m., Mr. Charles G. Johnson, vice president, presiding as chairman.

DISCUSSION OF SPECIFICATIONS AND TOLERANCES FOR LIQUID-MEASURING DEVICES (Continued).[7]

The Acting Chairman. Gentlemen, Mr. Holbrook has informed me that he has recovered sufficiently to continue the discussion of the specifications and tolerances, and we will now begin where we left off.

Mr. Holbrook. The committee feels that the last sentence in new Specification No. 7 will be clearer as an example if worded as follows:

> For example, if a device is designed and constructed so that (1) 1 gallon is the first graduation; (2) there is no stop, overflow pipe, or other automatic means of terminating the delivery; (3) the graduations are equally spaced; and (4) if the cross section of the measuring chamber is the same throughout its length, the minimum length on the scale or dial shall be 4.6 inches per measured gallon, the maximum cross-sectional area of the measuring chamber shall be 50 square inches; and if cylindrical, the maximum diameter must be 8 inches.

Now, during the noon recess some one has drawn on the board three scales which are used or may be used upon liquid-measuring devices, and has made the inquiry, under the provisions of the specifications as worded which of these, if any, would pass the specifications. (See fig. 2.) In all these cases all graduations are equally spaced.

Referring to No. 1, the length of the gallon in this case is 3.25 inches and a stop is provided at 1 gallon, at 2 gallons, and at 5 gallons, while at the 4-gallon point and at the 3-gallon point it is necessary to bring a pointer into coincidence with the line in order to determine the delivery. If the gallon graduation is the first one on this scale, if no graduation between zero and 1 gallon is provided, this No. 1 complies with Specification No. 7 as written.

No. 2 is a scale which depends entirely for its accuracy upon stopping a pointer in coincidence with graduated lines—and let me say that we are presuming in each of these cases that the lines are distinct and that the pointer is properly shaped and that the other requirements are met, such as that parallax is eliminated to as great an extent as possible, etc., so that it is possible to stop the pointer within a reasonable degree of accuracy to the lines. The measuring space on this scale is 4.8 inches per gallon. If there be no graduations included between zero and 1 gallon on this scale, then it complies with specification No. 7 as written.

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[7] For text of specifications and tolerances as finally adopted, see appendix of this report.

The third shows a space per measured gallon of 4.6 inches, and shows a stop at every main graduation. If there are no graduations between zero and 1 gallon on this scale No. 3, it complies with the specification as written, always presuming that the pump is accurately calibrated.

Mr. Ramsdell. Mr. Holbrook, could the stops be omitted on No. 3?

Mr. Holbrook. Yes; the stops could be omitted on No. 3.

Mr Ramsdell. Suppose we had a visible container that is supplied by a measuring pump located in the base. The diameter of the visible container is such that the spaces between the gallon marks

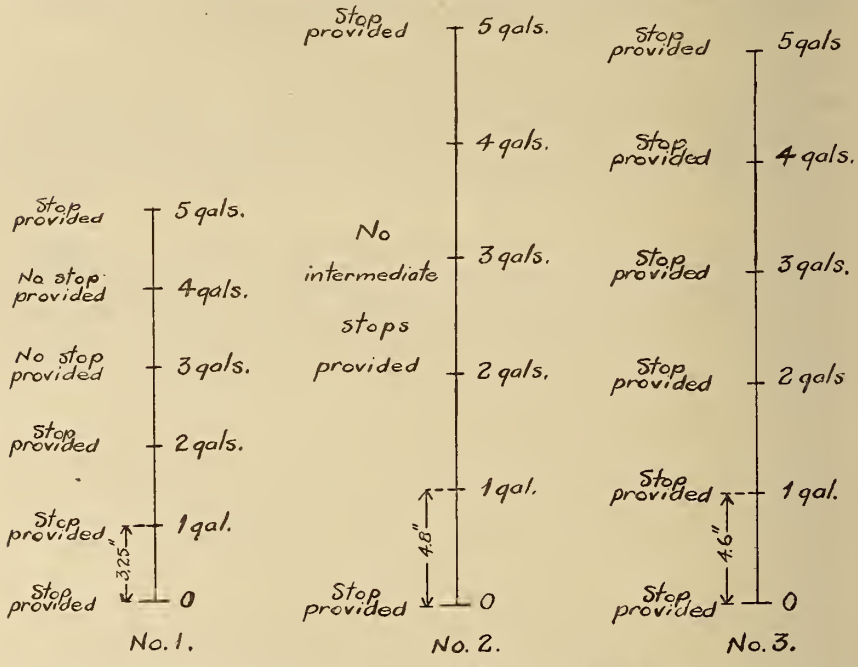

Fig. 2.—Three scale arrangements illustrative of provisions of proposed specifications.

are much less than in No. 3, probably as close together as in No. 1, and maybe a little closer. Yes; they would be a little closer, because the diameter is 10½ inches, I believe. Now, we have below that a circular device that is of sufficient diameter to give us your spacing of 4.6 inches on the circumference. Would it be necessary to have any quantity stop in that visible container? If not, can we show on the glass of that visible container any graduations?

Mr. Holbrook. Is the measuring part of the pump defined by stops, or do you depend upon——

Mr. Ramsdall. We depend upon the circular dial.

Mr Holbrook. But you depend upon a sharp pointer and the graduation lines.

Mr. Ramsdell. No; there is no pointer at all, Mr. Holbrook, in this case. We have the visible container that will show the consumer

or the buyer that the container is full and the different amounts standing off against the graduations. Now, we have below an all-metal measuring pump, to which is attached a circular dial, and that circular dial is of sufficient diameter to give us your spacing of 4.6 inches per gallon at the circumference. Now, the question I want to raise is can we show any markings whatever on that glass? There is no overflow pipe or quantity stop, as it may be called, in the visible container. We have got our measurements below apparently in accordance with your specifications.

Mr. Holbrook. That is the point I wanted you to make. The measuring pump below the visible container complies with all specifications applicable to the piston-type pump?

Mr. Ramsdell. Yes.

Mr. Holbrook. And you merely put your gasoline up into a measuring chamber—no; not a measuring chamber—up into a visible chamber, but you use your measuring pump for the purpose of determining the quantity?

Mr. Ramsdell. Yes.

Mr. Holbrook. I think that would comply.

Mr. Barnard. Mr. Chairman, if I am in order, it seems to me this particular section is going right over the heads of most of us. I know it is going over my head. I am not in a position to vote intelligently upon that one proposition. It seems to me it would be advisable if this new specification that Mr. Holbrook has prepared could be struck off so we could look that matter over to-night and study it, and take advice on it, it would be advisable to do so; possibly we would be in a better position to vote on this particular specification to-morrow. I am prepared to tell you right now I do not know how to go about it. If it be in order, Mr. Chairman, I would move you that this particular specification go over until some time to-morrow morning, in order that we may have time to consider it. I make that as a motion.

A Delegate. I second the motion.

The Acting Chairman. No. 5 goes over until to-morrow. It is the consensus of opinion of the conference that Specifications Nos. 5, 6, and 7 be referred to to-morrow's calendar for special and individual consideration. If there be no objection, such will be the order.

Mr. Barnard. If we can have the mimeographed copy of the amendment that Mr. Holbrook proposes, so we can consider that carefully, it would help. I do not think the majority of us have got it clear in our minds, so that we can consider it, without it being written out in some shape or form, if you please.

The Acting Chairman. It might be well, also, for those who have any further recommendations as affecting that specification to also prepare themselves with specific information, so that the committee can determine upon it, because it is the intention of the committee to endeavor to have all these specifications considered and passed. There will be no tentative specifications provided.

(The motion was put to a vote and agreed to.)

The Acting Chairman. Mr. Holbrook will have the rewording of specification No. 7 mimeographed for the benefit of the conference.

Mr. Barnard. I thank you.

Mr. Holbrook. Old specification No. 26 occurs at this point, being new specification No. 8, referring to "Constancy of delivery." The old specification provided that the amounts delivered should be within the tolerance provided, irrespective of the speed with which the apparatus is operated and irrespective of the time elapsing between operations, and provided for a test for a 24-hour period, requiring that the indication of the first delivery of the apparatus, after standing for a period of 24 hours, should be within the allowable tolerance. There was a note attached to it merely explaining the change in volume of gasoline resulting from a change in temperature and providing that that effect be eliminated in taking the first delivery. The committee recommends that that specification be reworded to read as follows:

The amounts delivered by any liquid-measuring device shall not vary from the standard by more than the tolerances hereinafter provided, irrespective of the speed at which the apparatus is operated, and, subject to the conditions of the special test described below, irrespective of the time elapsing between operations.

For the purpose of test, the condition of the device shall be such that a period of nonuse of one hour shall not result in an error of the first delivery of the device after such period of nonuse greater than the tolerance allowable on the smallest amount which the pump is designed to deliver; and a period of nonuse of six hours shall not result in an error of the first delivery of the device after such period of nonuse greater than 10 cubic inches, or in the case of a new liquid-measuring device 5 cubic inches.

The same note in regard to the allowance for temperature variations is then included, and a further note to the effect that—

In applying the 12-hour test it is recommended that the delivery be not made through a hose, since the amount of gasoline necessary to wet the inside of the hose will cause an additional shortage in the delivery.

Such shortage in the delivery should not be charged to the liquid-measuring device.

The time element in that specification has been cut from 24 to 6 hours since, in the opinion of the committee, pumps after some time in service will probably not stand up to the original requirements. It is the opinion of the committee that while no proper specification can be introduced requiring a priming stroke of the pump before the first operation in the morning, that the sealers and inspectors and superintendents throughout the country might well require by rule and regulation a priming stroke, and enforce that requirement in their respective jurisdictions. However, it is not considered that that is a proper requirement to put into the specifications which cover the manufacture and installation only.

Mr. Neale. In regard to that specification, the first figure "12," in the copy I have, should be "6." Refer to the words "in applying the 12-hour test," should that not be "6-hour test"?

Mr. Holbrook. That is right.

Mr. Neale. While I have the floor I will call attention to the fact that the mimeographer has run in the word "pump" instead of the newly adopted word "device."

Mr. Holbrook. "Device" is right.

Mr. Neale. I should also like to ask, in applying the six-hour test, since it is recommended that the delivery be not made through a hose, "How otherwise shall it be made?"

Mr. HOLBROOK. Upon special tests, such as this involves, the hose might be removed and delivery made directly into your measure from the spigot.

Mr. NEALE. I had in mind the question, "Do these large couplings come off readily?"

Mr. HOLBROOK. I understand the removal of the hose is a very simple process. The manufacturers might check me on that.

The ACTING CHAIRMAN. Many operators remove the hose, especially if it is attached to a pump which is on the outside, and not under cover. I know in California, almost every station removes the hose every night. So the fact that the specification requires this test to be made from the spigot without the hose, will not be any inconvenience to the operators.

Mr. NEALE. Do you refer, Mr. Chairman, to the can spigot, if there be one?

The ACTING CHAIRMAN. No; to the original outlet in the hose attachment.

Mr. HOLBROOK. Of course, delivery may be made from the spigot if they do not desire to utilize the hose.

The ACTING CHAIRMAN. Is there any further discussion on this particular specification?

Mr. COREY (representing S. F. Bowser & Co.). There is one pump of our manufacture in which the removal of the hose would be rather difficult. There are cases, of course, such as the chairman speaks of, where the hose is exposed and readily removable, but in one type of pump, the hose is inclosed when the pump is closed, and is not readily removable.

Mr. HOLBROOK. Mr. Corey, in the case of any hose which is not readily removable, delivery might well be made through the hose, but by calling the attention of the people who are going to enforce these specifications to the fact that the wetting of a hose is a factor, then I take it that if they find it necessary to deliver through a dry hose, they will allow in addition to this tolerance an amount which is found sufficient to wet such a hose after such a period of nonuse.

Mr. RAMSDELL. We assume in paragraph 3 on page 4 that we have under discussion, beginning with the words, "for the purpose of test," etc., that you refer to a 5-gallon pump. Would it not be well, if that is the case, to specify that in the language there inasmuch as you have specified the tolerance of 10 cubic inches in the next to the last line of that paragraph?

Mr. HOLBROOK. There is no reference to a 5-gallon pump in that specification, so far as I can see.

Mr. RAMSDELL. Should there not be such a reference?

Mr. HOLBROOK. No; I do not think so.

Mr. RAMSDELL. Did you not have a 5-gallon pump in mind? You specify the tolerance for a 5-gallon pump.

Mr. HOLBROOK. What will be the ratio of leakage of a 5-gallon pump and a 1-gallon pump? If you had the same number of valves in a 1-gallon pump of a given type that you have in a 5-gallon pump—and I take it the valves are about the same size—are they not subject to about the same degree of leakage regardless of the capacity of the pump? Then, obviously, if a 5-gallon pump is going to leak this much in six hours a 1-gallon pump will probably leak approxi-

mately the same amount, considering that the valves are in the same condition, will it not? The committee did not have in mind a pump of any certain capacity in this specification, but they had in mind that the series of valves used in the pump might leak within this allowable limit, and that outside this allowable limit the pump should be laid up for repairs.

The Acting Chairman. Are there any further comments on that specification. (After a pause.) If not, it will be the consensus of opinion that the specification is approved and passed.

Mr. Holbrook. Original Specification No. 3 covered "Indicating and registering parts," subdivided into two parts, (*a*) and (*b*). Old Specification No. 10 (*b*), in the opinion of the committee, contained details which should be incorporated with old No. 3 for the sake of clarity. These suggestions have been introduced into the new wording, reading as follows:

Counters and graduated scales used on liquid-measuring devices to tally sales and deliveries to individual purchasers or to indicate the amount delivered when any portion of the cycle or stroke has been completed shall be of such size and style and shall be so located and disposed that they are clearly visible to and readable by the customer from any position which he may reasonably be expected to assume. The graduations shall be of such character and arrangement that the major ones are clearly distinguishable from the minor ones.

One word has been omitted in the first part of that specification. It may not be necessary, but it clarifies it to a certain extent to include after the words "counters and graduated scales" the word "dials" used on liquid-measuring devices, etc. I think there is no modification in the meaning of the old specification.

The Acting Chairman. Is there any discussion on this specification?

Mr. Neale. Mr. Chairman, it seems to me that is something that is pretty important. We have certain scales made to-day, and used, which start out horizontally and gradually rise in the scale, getting away from parallelism, and I believe that is worthy of consideration, because, even though a manufacturer did not intend this to be used as an actual measuring element, it is so used. It seems to me that if after that sentence is completed, after the words "minor ones," a comma should be placed there and these words added, it would do away with that kind of scales in use:

and the graduations on all linear scales shall be parallel to each other, and perpendicular to the longitudinal axis of the measuring chamber.

I presume all inspectors and officers of weights and measures here are familiar with that particular scale of which I speak. It involves what I term an ingenious engineering principle whereby you can make any adjustments and still have the pointer come some place on the line, but it is an extremely difficult matter to set it properly. Hence, I believe that the words "all graduations on all linear scales shall be parallel to each other, and perpendicular to the longitudinal axis of the measuring chamber" should be added. I can not see why that particular manufacturing company believes it is making a good measuring device and adheres to that kind of measuring scale.

The ACTING CHAIRMAN. Do you not think, Mr. Neale, the specification in its present wording does obtain the object which the specification is designed to obtain?

Mr. NEALE. By the wording here, "so located and disposed that they are clearly visible to the eye?"

The ACTING CHAIRMAN. Yes.

Mr. NEALE. I maintain that a pointer about the size of a round lead pencil and brought to a sharp point, coming some place on a slanting line, is not close enough to measure by when tolerance is considered.

The ACTING CHAIRMAN. On account of there being a variety of these pumps, I do not believe there is any objection on the part of the committee to accepting the recommendation of Mr. Neale. Have you in mind just the wording you want used?

Mr. NEALE. Yes; I meant to offer that to the committee.

The ACTING CHAIRMAN. Just specify again exactly the wording you want, Mr. Neale.

Mr. NEALE. After the words "minor ones," place a comma, followed by the words "the graduations on all linear scales shall be parallel to each other, and perpendicular to the longitudinal axis of the measuring chamber."

The ACTING CHAIRMAN. Do all the delegates understand that recommendation?

Mr. BEAN. The gentleman refers to the scale on the pump manufactured by my company. That pointer can only be brought to one point on that scale to correspond with any position that the stop is sealed in. Consequently, it is not quite true that the pointer may be brought to any position on that line, for after the stop is adjusted so that the pump is delivering the quantity called for by that particular stop, the pointer is brought to a corresponding position on the line and sealed. It is even a more accurate way of adjusting the pointer to a graduation than if the lines were parallel. I do not think any such clause as that should be put in the specification.

Mr. NEALE. Mr. Bean is perhaps all right in his statement. When you do set the stop and operate to the stop, it is true you can not go any farther, and the pointer coming crossways of one of these slanting lines will have to rest some place, and perhaps in the proper place, but, indeed, there are all kinds of lines on these scales that have no stop to guide them, hence the graduations become purely and simply the measuring elements. In talking to many operators I have yet to find but two who coincide in their ideas as to where that finger should rest across one of those slanting lines. Some say it should just touch it, and some say it should coincide with the point outside. It is true it will touch it at some place. Mr. Bean, you have a certain number of stops there, have you not?

Mr. BEAN. Yes.

Mr. NEALE. Opposite these stops comes a particular line, but how about these other places—gallons and half gallons—where there are no stops?

Mr. BEAN. You adjust the pointer.

Mr. NEALE. Are you guided by the pointer in measuring other quantities where there are no stops?

Mr. BEAN. Yes; that pointer is sealed.

Mr. Neale. Indeed, yes; but I maintain again that when a pointer comes against a line in a variable slanting position, no man in the world can tell where that mark or position is going to be. I have had no discussion with the gentlemen here about that particular thing. I presume they are familiar with it, but I dare say that until they have learned of its ingenuity it has struck their minds as peculiar to see a scale come from a manufacturer with these slanting lines and the pointer up against them. The place of intersection of the pointer and the line is so indefinite that I can conceive, having made some study of it, that few persons will know when the pointer arrives at the proper point on the slanting line.

The Acting Chairman. Speaking entirely from the practical point of view, I believe that scale has given us more concern than perhaps any other element in the work. I have had constant complaints from the men in the field, who did not understand and did not seem to comprehend. They did not know where the quantity was determined on the line, by reason of its slant, and it was only after a long and detailed explanation on the part of your service men that I personally grasped the principles of the construction. I believe it would be a proper specification to endeavor to obtain parallel graduations—have the fixed quantities indicated on a horizontal line. I am speaking to you entirely from personal experience. What is your opinion of it, Mr. Holbrook? I am very much in favor of your suggestion, Mr. Neale.

Mr. Holbrook. I think it is a question for the conference to decide upon. They have in mind exactly the kind of a scale which is referred to, and they have an amendment before them telling what kind of scale is desired, and it becomes a matter of the consensus of opinion of the delegates as to whether the former scale has caused trouble, and whether the latter scale is preferable; and, if it is the consensus of opinion of the delegates that that device is not a proper means of determining quantity, they can so express themselves by an adoption of the amendment proposed.

The Acting Chairman. Do all the delegates understand just what particular part of the apparatus is under discussion? If you do not, we will make a drawing or diagram so it will be perfectly clear.

Mr. Barnard. I suggest that you make the drawings, Mr. Chairman.

The Acting Chairman. We could not ask a better man to do that than the representative of the Wayne Co.—Mr. Bean. Will you kindly make a drawing here of your scale?

Mr. Ramsdell. Mr. Chairman, I want to suggest at this point that Mr. Bean make a demonstration of his pump. He happens to have one here. I think he can make his position very clear with that pump before us. It seems to me a demonstration of that kind will be highly desirable before the delegates are called upon to pass upon the matter.

The Acting Chairman. This will be satisfactory to the delegates?

Mr. Bean (drawing sketch on the blackboard; see fig. 3). The scale is something like that [indicating]. The 5-gallon mark is horizontal. The other graduations slant gradually downward. The pointer is here [indicating] on an adjustable stop which can be sealed, and after the stop—any quantity stop—is sealed, the pointer

is then set to the line to correspond with that stop and sealed, and it will be found that in each case—this is logarithmic scale—when any particular point here is correct on any sealed stop that the other points must be correct where they hit the line. That is a mathematical principle. It is a scale which has been approved by the Patent Office. These slanting lines are in such position that the pointer can not be wrong if the first gallon stop or the 5-gallon stop is correctly sealed and the pointer in turn sealed to correspond with either one of them. The balance of the graduations must come right. The pointer must set so as to deliver an accurate quantity. In other words, if this line right here [indicating] is that broad, and you set the pointer, after sealing the 1-gallon stop, so that it just touches there [indicating], it will just deliver the quantity at 3 gallons when it comes to the same position at the bottom of the line on each of the other graduations. If you set it at the center of the line, it would come just to the center of the line at these other graduations.

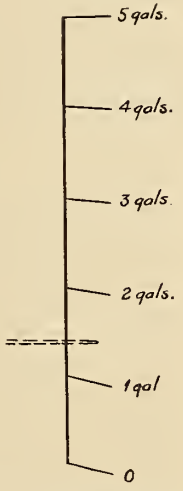

FIG. 3.—Scale having nonparallel graduations.

The ACTING CHAIRMAN. To make it clear, the pointer first comes even with your horizontal line indicating your 5-gallon capacity. As your pointer reaches a point it has to touch the point of contact with this graduation here [indicating], leaving this part of the graduation exposed and not covered by your pointer. I believe these lines here are a little more slanting.

Mr. BEAN. Yes, sir; I believe they are a little more slanting.

The ACTING CHAIRMAN. The question oftentimes referred to me is at what particular point on this line is this pointer supposed to make contact. It seems that the operators of the pump sometimes stop here [indicating], and there has been more or less misapprehension on that point.

Mr. SMITH. Mr. Chairman, I think, owing to the construction of this device and the explanation which Mr. Bean has given, we can understand how it is supposed to be operated; but the difficulty is this, as I see it: The man who adjusts the pump may adjust it so that the extreme end of the pointer, the sharp end of it, will intersect the graduation line at the lower edge.

The ACTING CHAIRMAN. Mr. Smith, in drawing this graduation line the width has been exaggerated; they are not that wide.

Mr. SMITH. No; I realize that.

The ACTING CHAIRMAN. They are approximately, I believe, about six one-hundredths of an inch, are they not, Mr. Bean?

Mr. BEAN. Yes; they are one-sixteenth of an inch.

Mr. SMITH. Regardless of that fact, the pointer intersects the line at an indefinite relationship. The operator of the pump may read to that point, or he may read to where the heavy part of the pointer intersects the edge of the scale, which is very much different from the end of the pointer. There is a difference there represented by the short leg of a right-angle triangle. The distance represented on the blackboard there, which is, of course, exaggerated, is about three-quarters of an inch. It is that inability of the operator to know

where he shall read that pointer in connection with his scale that introduces the difficulty. Instead of reading it to the point, as he is supposed to do, he perhaps reads it halfway in the middle of the pointer, and uses as his indicating line the edge of the scale, which is not what he is supposed to do under your explanation and according to our understanding.

The Acting Chairman. Is this matter now thoroughly understood by the conference? Inasmuch as it is an amendment to the recommended specifications, I wish some one would make a motion to the effect that it be adopted, so we can take a vote on it.

Mr. Smith. I move the amendment to Specification No. 9, as read by Mr. Neale, be adopted.

The Acting Chairman. Is there any further discussion?

Mr. Bean. The scale will do all it is required to do. The pump can be set so as to deliver within the tolerance, and there will be no trouble if the sealers will all set the center of the pointer to the center of the line. They can easily be instructed to that effect. To change that means redesigning that entire pump. If you endeavor to make this section retroactive, it will throw out thousands of pumps all over the country.

The Acting Chairman. There is no intention to make it retroactive, Mr. Bean.

Mr. Bean. We would have to redesign the entire pump. That means a cost of a great many thousands of dollars. I believe instructions could be issued so that sealers can set that pointer exactly, and we know positively the pump will deliver within the tolerance. There is one pump with that scale on demonstration here now, and I would like to bring it up here and demonstrate it to you gentlemen.

The Acting Chairman. Does the conference require any further instructions on this particular phase of this specification?

Mr. Bean. I can have that pump disconnected and brought up here in a very few minutes.

The Acting Chairman. Would the delegates prefer to have a mechanical demonstration made of the apparatus before deciding upon this matter?

Mr. Cushman (representing the Gilbert & Barker Manufacturing Co.). Mr. Chairman, as it is the pointer that is giving the trouble, in other words, as we do not know which end of the pointer or which part of the pointer should be used, a button on the end or something to designate just which part of the pointer should come in contact with the line might be a way out. Anything, whether it be an arrowhead or anything to indicate that it is the end of the point which should intersect the line, might help you.

The Acting Chairman. Make the point more definite.

Mr. Bean. The point now is the same as the point of a lead pencil.

Mr. Neale. It is an important proposition, and the delegates could well afford, out of courtesy to the company, to give them the privilege of showing this machine here. There is a point of intersection as it goes by—there must be—but still it remains for me to find out how we can know the point of intersection. I am informed the representative of the company who makes the device——

The Acting Chairman. Under the privileges of discussion on the motion, we will include a mechanical demonstration for the benefit

of the conference of this particular part of the apparatus, through the courtesy of Mr. Bean.

Mr. BEAN. To-morrow morning?

The ACTING CHAIRMAN. No; this afternoon. Is it convenient for you?

Mr. BEAN. Yes, sir.

The ACTING CHAIRMAN. Would you prefer to make this demonstration in the morning?

Mr. BEAN. It does not make any difference to me.

Mr. HOLBROOK. Do you think you can get the pump up here?

Mr. BEAN. I think probably in 15 minutes, if we can have a truck to haul it over. It will not take very long to disconnect it.

Mr. HOLBROOK. It could go over until to-morrow morning in consideration of these other specifications all being laid over, but any time that suits you is all right.

The ACTING CHAIRMAN. As long as the matter is on our minds right now, suppose we continue with the demonstration.

Mr. SERAPHIN. Why not, after the adjournment of this meeting this afternoon, go down in a body and have the demonstration on the platform?

The ACTING CHAIRMAN. The delegates will not go down there. It is better to have the demonstration here and now.

Mr. COREY. I rise, not to make objection, but simply to ask that there be some emphasis placed on this portion of this paragraph saying that the reading shall be clearly visible to and readable by the customer from any position which he may be expected to assume. That is a rather indefinite proposition.

The ACTING CHAIRMAN. It is intended to be indefinite.

Mr. COREY. The question is, "What is a reasonable position?"

The ACTING CHAIRMAN. I do not believe we can determine that by any measurements.

Is it, then, the consensus of the opinion of the conference that Specification No. 9, in its present wording, is approved? [After a pause.] The Chair will so rule, and we will act upon the amendment after the demonstration.

Mr. SMITH. Mr. Chairman, there is a matter which has occurred to me in the study of this matter, and I am not sure in my own mind whether it should be mentioned in the discussion of No. 9 on this page, or No. 12, which occurs later. This matter refers to graduation lines. This paragraph is headed "Indicating and registering parts," and No. 12, to which I refer, is entitled "Lettering—graduations."

The ACTING CHAIRMAN. I believe it comes under No. 12.

Mr. HOLBROOK. Graduations should be stricken out of No. 12. That refers to old No. 10 (b), which is now No. 8.

Mr. SMITH. Briefly stated, my thought is this: We have said in this specification that graduations shall be of such character and arrangement that the major ones are clearly distinguishable from the minor ones. In other specifications, we have brought out the fact that the indications should be clear and distinct; the reading, in other words, should be clear and distinct. I think we have left the matter somewhat indefinite, and to clarify that I would suggest for the consideration of the conference something to this effect:

In all types of liquid-measuring devices which have a graduated scale as the sole means of determining the amount of liquid discharged, the width of the graduation marks shall not exceed 0.04 of an inch.

I have suggested that figure as being readable and at the same time not too small. I think a graduation mark 0.04 of an inch wide will be clearly visible from any position which the customer can reasonably be expected to assume. At the same time I think it is small enough to give us an accurate reading. I should like to see the maximum width of graduation marks on all devices which are solely dependent upon graduated scales for their reading to be specified as a certain definite amount, and I would suggest that figure.

The Acting Chairman. Is there any further discussion on the recommendation of Mr. Smith? If not we will consider the motion covering that particular amendment, Mr. Smith.

Mr. Smith. I move you then, Mr. Chairman, that Specification No. 9 be further amended by the insertion of the following words, following the amendment proposed by Mr. Neale:

In all types of liquid-measuring devices which have a graduated scale as the sole means of determining the amount of liquid discharged the width of the graduation marks shall not exceed 0.04 of an inch.

The Acting Chairman. Are there any further remarks regarding this amendment to Specification No. 9, as proposed by Mr. Smith?

Mr. Neale. I second the motion.

(The motion was put to a vote and was agreed to.)

The Acting Chairman. We will then proceed to No. 10.

Mr. Holbrook. Specification No. 10 includes the material formerly included in old Specification No. 9 in reference to pointers and indicators. The specification reads as follows:

All pointers and indicators which when used in conjunction with a graduated scale or dial indicate the amount of liquid discharge or the value of the delivery at a predetermined price per unit of volume shall be so shaped that a correct and accurate reading is given. Pointers and indicators are required to be symmetrical about the graduation lines at which they may stand. The width of that part of the pointer or indicator which reaches to the finest graduation marks shall not be greater than the width of such marks.

The only change of importance in that specification is the defining of blunt-ended types of pointers, and limiting them to widths not greater than the width of the finest graduation marks on the scale over which they travel.

The Acting Chairman. Is there any further discussion of that specification. [After a pause.] If not, it will be the consensus of opinion that that specification is approved and adopted.

Mr. Holbrook. The suggested rewording of new Specification No. 11, old Specification No. 17, is as follows:

When a liquid-measuring device is provided with a graduated scale or dial, this scale shall be riveted to its supports or otherwise permanently fixed in position: *Provided, however,* That in the case of liquid-measuring devices of the gauge-glass type a sliding scale will be permitted when the displacement of such scale is, by suitable means, automatically prevented at all times when liquid is being discharged from the delivery outlet.

There is no change of importance in the rewording of that specification.

The Acting Chairman. Are there any recommendations or discussions on that specification. [After a pause.] If not, it will be the consensus of opinion of the conference that specification No. 11 is approved and adopted.

Mr. Holbrook. Specification No. 12 formerly was headed "Lettering—graduations." Part (*a*) reads:

All markings, instructions, and graduations required under these specifications shall be of such size, design, and location that they will not tend to become obliterated by dirt or oil, or for any other reasons tend easily to become illegible.

Section (*b*) of this specification, as tentatively adopted last year, has been incorporated with Specification No. 9, which has already been adopted. No change has been made in Specification No. 10 this year except that—I think no change at all has been made.

The heading "Lettering—graduations" is a little bit conflicting, but inasmuch as the specification calls for graduations so placed that they will not tend to become obliterated by dirt, that heading might still be continued.

The Acting Chairman. The original specification consequently is unchanged. Is there any discussion on this specification?

Mr. Smith. There is a situation which I have noticed on some of the so-called visible devices in the matter of the placing of the figures. I refer to such sequences of figures as 5, 1, 2, 3, 4, on the glass of a visible device. I think that such a system of numbering is at fault. I think the sequences should be in regular order from 5, 4, 3, 2, 1, or 0, 1, 2, 3, 4, 5, or something of that nature. I think we merely multiply the possibilities of error if we have an inverted or reverse—whatever you call it—scale, such as I have mentioned. I would suggest also that a provision be incorporated in this specification providing that the numbering should be uniformly spaced, or placed, in reference to the graduation marks. I have seen visible devices where the numbers were rather inaccurately placed. That is, they were slopped around more or less in relation to the line itself. I would suggest, then, for the consideration of the conference, a motion to the effect that this specification be amended by substituting a semicolon for the period at the end, to be followed by this wording:

Figures defining the value of graduations shall be uniformly placed in reference to the graduation lines and shall be in regular sequence, that is, sequences such as 5, 1, 2, 3, 4, shall not be permitted.

Mr. Holbrook. Would you object, Mr. Smith, to making that a separate specification?

Mr. Smith. Not in the least, Mr. Holbrook.

Mr. Holbrook. I do not think it quite conforms to the idea of Specification No. 12. It seems that that might readily be inserted just before Specification No. 12, and when the specifications are promulgated, the numbers can be changed accordingly.

Mr. Smith. That will be entirely satisfactory. My suggestion that it be incorporated in No. 12 was to avoid the necessity of renumbering the specifications.

Mr. Holbrook. That can be done later.

The Acting Chairman. Is there any further discussion of this amendment to Specification No. 12?

Mr. Barnard. I second the motion.

(The motion was put to a vote and agreed to.)

Mr. Holbrook. Specification No. 13 now reads as follows:

Scales in opposite directions prohibited.—The use on a liquid-measuring device, of two graduated scales reading in opposite directions and referable to the same indicating means, shall not be permitted.

No change in meaning has been incorporated in this specification, which was old Specification No. 11.

The Acting Chairman. Are there any objections or discussions on this specification? [After a pause.] If not, it will be the consensus of opinion that the specification is adopted.

Mr. Holbrook. Specification No. 14 includes the material formerly contained in old Specification No. 8(*b*). The material in 8(*a*) has already been incorporated with new No. 6, which has been laid aside for the present. The suggested rewording of the specification is as follows:

All liquid-measuring devices shall be so designed and constructed that the indicating element in tallying deliveries to individual purchasers is returnable readily to a definite and clear zero reading before the next delivery is begun.

There is no material change in the specification adopted last year.

The Acting Chairman. Is there any discussion or objection with reference to that specification?

Mr. Neale. To place the matter properly before the conference, I move that the following amendment be made to the specification as read by Mr. Holbrook. After the word "begun," which terminates the sentence, place a semicolon instead of a period, and then follow with this wording:

And this return movement shall be in a backward direction only, and a stop must be provided to prevent the travel of the movable elements beyond the zero graduation in the backward direction.

Mr. Smith. Mr. Chairman, I second the motion of Mr. Neale.

The Acting Chairman. That recommendation was considered by the committee, but the committee did not feel that it had had sufficient amount of evidence to justify incorporating that phase into the specification. The question in the mind of the committee was whether this specification is applicable, or whether it is possible and practicable, or whether it is appropriate and could serve any purpose which is not being obtained to-day without inflicting upon the manufacturers of pumps a great deal of unnecessary expense. I simply quote the conclusions of the committee in discussing that phase of it.

Mr. Neale. I will discuss the reasons why I propose that. In the first place, it is not impossible, and, indeed, it is now being nicely done by several manufacturers. I had in mind there the round counter which clicks along as deliveries may be completed, possibly to the figure "7"—seven gallons. I know it is a nice thing for the public to see that 7 before them; it is conspicuous and plain, but many of the types were so easily manipulated they almost invite fraud, because the least finger motion will push them forward to 8 or 9 or 10, as the case may be. Hence I can see no reason why it can not be arranged. I know it has been done, so that the operators seeking to perpetrate a fraud easily would be barred somewhat from doing it. In turning it back to zero to get his next showing for the next customer, which is proper, he could not go past zero and make a showing of 10 immediately, or 9; he could only go to zero and stop and start over again. That is really what the thing is intended to do. I have seen made by my friends, the manufacturers, loose tin pan arrangements, which the wind can almost blow around. It seems to me that when you are striving for specifications that will do this, that, and the other thing so closely, there is no reason to leave a thing

that invites fraud on the part of the operator. You have a pointer in some cases with a little thumb projecting outward, and you can easily turn the counter back to zero and start over again. It seems to me that if I can just as easily throw it forward and by a sleight-of-hand performance show 9 when I only gave 7, it is dangerous. I can not see why it can not be mechanically taken care of and do away with an easy way of perpetrating a fraud.

Mr. Pocock (representing Dayton Pump & Manufacturing Co.). It seems to me that objection is covered by the fact of our having it in full view of the customer, in any reasonable position. That is intended to cover that point exactly. That can not be done without the customer being able to see it. If it was something he could do secretly and underhandedly it would be a different thing. Another thing is the difficulty of making such a device. I do not believe the point is well taken.

Mr. Corey. Mr. Chairman, I know personally of no such device having been made and I can see difficulties in the manufacture of such a device. Neither do I see that any particularly good end is to be served. If the operator is bound to cheat he need only turn it back a gallon or two short and count it on the next delivery. He can start wrong just as well as he can end wrong. I can see no particular point to be gained by the complicated device which, so far as I know, has not yet been designed to meet such a possibility.

Mr. Holbrook. If I may say a word here, I have seen at least one device, and I think that possibly Mr. Neale may have such a device in mind, that to my mind was extremely objectionable. It was on a new design of pump, which certainly was never turned out in any great quantity, and it was of such a nature that it certainly should be prohibited upon the ground that it facilitated the perpetration of fraud, and it was under that specification that we criticized it. In view of the fact that the manufacturer of the device at once admitted the fraudulent possibilities and at once changed the device so that it could no longer easily be manipulated, the specification to the effect that no device shall be such as to facilitate the perpetration of fraud was sufficient to afford the necessary protection in that case.

Now, as Mr. Johnson has said, the committee considered this, but in the time available they were not able to judge with accuracy in regard to the probability of constructions that would be necessitated by the amendment which Mr. Neale has proposed, and I think that Mr. Neale might dwell upon that phase of it a little bit for the information of the conference. Also, while Mr. Neale is on his feet, I would like him to express an opinion as to whether the device which he has in mind can be, in his opinion, sufficiently regulated under the specification which forbids the construction of a device in such a way as to facilitate the perpetration of fraud.

Mr. Neale. Mr. President, it is a pretty big contract. It is pretty hard for each one of us in his own bailiwick to say what is and what is not fraudulent. I will not express my opinion as to how a thing is painted because I dislike the color or something like that. I have in mind—this is a family affair, I presume, and we can speak names of manufacturers—I have in mind a type where the pointer stands still and the background, consisting of a chart, turns; it flips about; it is a loosely mounted chart. It seems to me it is a wheel which is actu-

ated by the upward movement of the plunger piston that I have seen in a recent development. The representative is right here in this room. They have taken care of it whereby it could not be pushed forward but could be turned in a backward direction and stopped at zero. I can not imagine, Mr. Holbrook, then, but what you can take a comparatively simple toothlike arrangement and do it. Personally, I think it can be done mechanically and simply and give that thing the dignity of what it means. If it is sufficiently taken care of, Neale wants to go back, and as long as he is there make no rule which is not indorsed by this conference. Whether my idea in regard to it is turned down by the conference or not, I would be happy to go back and abide by it. In other words, I would rather go home wrong and be supported than to go home right and be alone.

Mr. Ramsdell. I want to indorse what Mr. Corey has said in this matter. The industry is pretty well represented at this conference, and, so far as we know, nothing of the kind is being used by us manufacturers at least. We have never seen anything of the kind on any pumps. If it means the redesigning of the pump, or a portion of it, it is going to put us to a great deal of expense. If, however, something is to be gained by it, I think the industry will be glad to consider it. If anything is to be gained by this change, we are heart and soul in this effort to give the public the benefit of it. The competition in industry is sufficient to sharpen our wits in an effort to do that. There has been a very great improvement made in these instruments in the last few years, and it still continues. We are building a better product to-day than we have ever built before, and we would like to build it better, but we do not like to be called upon to make changes that are going to involve a great deal of expense unless it can be clearly shown that something is going to be gained by it; that the public is going to get more than they are getting now. We feel very much opposed to this change that has been suggested.

The Acting Chairman. I believe the conference should be cognizant of the fact that in the judgment of the committee they did not deem it wise to go into the matter, and so far as I am personally concerned, as a member of the committee, I would like the matter to go over until next year and be considered then as an amendment to the specification. However, that is my personal opinion.

Is there any further discussion upon this amendment? It has been moved and seconded that it be adopted. Are you ready for the question?

(The motion was put to a vote and was rejected.)

The Acting Chairman. The amendment goes on the table for reconsideration by the conference committee next year.

Mr. Holbrook. Specification No. 15 includes that material which was formerly included in tentative Specification No. 16. It reads as follows:

Stops to be positive.—When the stops or other stroke-limiting devices on a liquid-measuring pump are subject to direct pressure or impact, in the operation of the pump, such stops shall be of such construction that the permanence and security of their positions is not solely dependent upon friction; that is, under the conditions designated, the construction must provide for a positive, nonfrictional engagement of the parts whose relative motions are to be prevented.

Before going further we may say that a number of misunderstandings have occurred on that specification, and as in one or two other cases, which have formerly been pointed out, it is probable that arguments upon the specifications would arise for this reason: The specification is almost self-contradictory. Two pieces of material which are to be held together in such a manner that their engagement is solely dependent upon friction, is one thought. A positive nonfrictional engagement of the parts whose relative motions are to be prevented, it occurs to the committee, is another and different thought. To require a device which is not solely dependent upon friction is a weak construction. To require a positive nonfrictional engagement of parts is a very much stronger construction. Therefore, in adopting this specification in its final form, it appears to the committee that it should either adopt one wording or the other, and should not attempt to define the words "engagement of parts not solely dependent upon friction" by using the words "a positive nonfrictional engagement of the parts whose relative motion is to be prevented."

In considering the placing of the stops, the committee has come to the conclusion that a set screw, fastening the stops upon a smooth rod is not a satisfactory engagement. While there may be some question in the minds of mechanical engineers as to whether or not that is an engagement which is not solely dependent upon friction, few mechanical engineers will disagree with the statement that such a device is not a positive nonfrictional engagement of parts whose relative position is to be prevented. Therefore, in rewording the specification, the committee has adopted the latter wording in the following:

Stops to be positive.—When the stops or other stroke-limiting devices on a liquid-measuring pump are subject to direct pressure or impact in the operation of the pump, such stops shall be of such construction that the permanence and security of their positions is provided for by a positive, nonfrictional engagement of the parts whose relative motions are to be prevented.

That is a change from last year only in that it cuts out the weaker of two clauses and adopts the stronger of the two clauses which were decided upon last year. The committee has also added the words:

Such stops shall be so designed and constructed that adjustment within the prescribed tolerances can be made.

I see several times in this suggested rewording that the words "liquid-measuring pump" are used, and in accordance with our usual practice the words should be changed to "liquid-measuring device," which is the way in which we now describe these devices.

Mr. Cummings. I would like to inquire at this point whether the reworded No. 15 would be construed as holding that a stop held by the use of a cup-pointed set screw is or is not a frictional stop? In other words, would that stop be prohibited under this specification?

Mr. Holbrook. In the opinion of the committee a cup-pointed set screw, or a set screw of any kind, engaging a smooth rod, is not a positive nonfrictional engagement.

The Acting Chairman. Are there any further remarks or suggestions on this specification?

Mr. Corey. Mr. Chairman, that, as I understand it, would bar the use of set screws for stops. That is the statement, is it not?

The Acting Chairman. That is Mr. Holbrook's explanation of the committee's understanding of the specification.

Mr. Corey. I am led to wonder just what the basis for the objection is. We know, of course—the manufacturers know—that there are a good many hundred thousand pumps in use with stops held by set screws. Set screws have been used for pretty nearly every purpose that could be imagined since mechanics first began, and we wonder just why exception is taken to the use of cup-pointed set screws in cases of that kind. I want to go on record as making a vigorous protest against such an interpretation.

Mr. Holbrook. The protest, I think, should not be directed against the interpretation, because it will be granted by most engineers that a set screw, whether or not it is cup pointed, screwed up against a smooth rod, is not a positive nonfrictional engagement. The committee had to adopt, or decided to adopt, one or the other of the wordings which were adopted by the conference last year, and they took the stronger wording. Now, if in the opinion of the majority of the delegates a cup-pointed set screw screwed up against a smooth rod provides a satisfactory engagement for the stop, then an amendment should be interposed to the effect that—

The permanence and security of their positions is not solely dependent upon friction.

In that case, mechanical engineers, I think, will agree—and it may be accepted here as the opinion of the committee on specifications—that under such a wording the cup-pointed set screw is allowable. However, I have endeavored to explain before the argument started that the cup-pointed set screw would not be allowed under the present wording of the specification; and in considering the specification the conference may well direct its energies to adopting one or the other of these phrases, both of which were included in the specifications last year. In the opinion of the committee there is no question but what a positive nonfrictional engagement of a stop and rod is very preferable to a cup-pointed set screw screwed up against a smooth rod. If the second method is satisfactory to a majority of the delegates, an amendment to the effect that the engagement shall not be solely dependent upon friction will accomplish the purpose which you have in mind. To the committee it appeared that with the continual pounding over a long period of years which these stops receive, from the rack traveling up and hitting the stops, there was very great danger, or there was some danger, of slippage of the stop along the rod, and there is also the danger of the loosening of a set screw, which would allow the stop to slip along the rod very easily. Instances have been found in which the stops have so traveled along the rod. Of course, it should be remembered that the result is overmeasurement rather than undermeasurement when such an accident occurs.

Mr. Corey. I might point out that from an engineering standpoint the difference between a nonfrictional stop on a rod and a flat surface is great, and if the rod has a flat surface on it, then a good set screw can be considered a nonfrictional stop, I believe, inasmuch as its engagement is far greater and far stronger. It is so considered. In a great deal of engineering work we use the set screw on a

flat surface where we would not use it on a round shaft. We use it on a flat surface made on the shaft. In the matter of construction it looks to me as if that would be a great improvement.

Mr. SCHOENTHAL. Mr. Chairman, it strikes me that because a thing has been in existence and we have been doing it wrong for a number of years, that is no reason why it should not be changed. We are engaged here in trying to draw a set of specifications to meet modern conditions. It is my personal experience that a set screw, screwed up against a smooth rod. will not hold. In the District of Columbia for the past four or five years we have found is necessary in all cases where stops were secured by screwing a set screw against a flat surface to bore holes through the rod and insert pins in order to hold those stops in their places. I am thoroughly in favor of this specification.

Mr. IRVINE. I would like to say I am in favor of the construction put on that section by the committee. I am not in favor of the set screw. I have had some experience with them, and I find they work loose and can be moved with a hammer. I am not in favor of the set screw at all.

The ACTING CHAIRMAN. Are there any further remarks on this specification? If not, the chairman will entertain a motion either to accept the specification or to amend it.

Mr. SCHOENTHAL. Mr. Chairman, I move its adoption.

(The motion being seconded, it was put to a rising vote and was agreed to by a vote of 19 in favor and 2 opposed.)

Mr. HOLBROOK. Specification No. 16 contains the material formerly included in the original wording of No. 23, and refers to stop mechanism. The wording recommended by the committee is as follows:

Stop mechanism to be definitely positioned.—All liquid-measuring devices designed to deliver two or more different predetermined amounts by bringing into operation different stops or other means of defining the delivery shall be so designed and constructed that the position for the proper setting of each stop is definitely and accurately defined, inadvertent displacement from this position is obstructed, and the delivery for which the device is set at any time is clearly and conspicuously indicated.

A variation in the wording has been made from the original specification largely in the interest of clarity. The specification, as adopted last year, apparently, and I think, inadvertently, required that stops, which were connected together in such a way that one device operated all of them, were required to meet certain conditions, but that stops that were not operated by one device, apparently, under the terms of the specification, were not required to meet these conditions. I think it will be granted that if necessary in one case it is equally necessary in the other. Therefore, the committee has changed the specification to require that the stops, however operated, shall be so designed and constructed that the position for the proper setting of each stop is accurately and definitely defined, inadvertent displacement from this position is obstructed and the delivery, for which the device is set at any time, is clearly and conspicuously indicated.

The ACTING CHAIRMAN. Are there any remarks or suggestions on this specification.

Mr. Ramsdell. Does that mean that the stops must be locked into position?

Mr. Holbrook. No; the word used is the word "obstruct" and not the word "prevent." In the opinion of the committee the change of position of a stop is obstructed provided it is so placed that inadvertent displacement will be obviated—that is, that it is not liable to fall back out of position, but that it is necessary to actually turn it out of position.

The Acting Chairman. Are there any further remarks or suggestions. [After a pause.] If not, we will consider that the conference approves specification No. 16, as suggested by the committee.

Mr. Holbrook. I find for the first time that there has been a typographical error in numbering these specifications, but if we adopt the numbers as given here, the renumbering can take place at any time. We are now addressing ourselves to specification No. 15, which appears on page 8. The original wording of this specification provided:

Provision for sealing.—All devices, adapted to be altered for adjusting or correcting the delivery of a liquid-measuring device, shall be of such construction that they can be sealed, either separately or together, in such a manner that the position of none of them can be changed without destroying the seal or seals: *Provided, however*, That this shall not apply to such devices as alter the price and consequently the delivery of such a liquid-measuring device as is described in the proviso of specification No. 5.

The original wording has been adopted by the committee, and I would like to add at this time that a delegation of manufacturers, representing some seven pump companies, has requested the bureau to urge upon the weights and measures officials the necessity and advisability of enforcing this particular regulation in the way in which it is written.

The Acting Chairman. Are there any remarks or suggestions. [After a pause]. If not, we will consider this specification No. 15, appearing on page 8 of the document, to have been approved by the conference.

Mr. Holbrook. We will avoid trouble if we call these by the number as given here, in which case there can be no question about what specification we are acting on. We have already called attention to the fact that the numbering is incorrect, and no possible harm can be caused thereby, and the numbers can be changed in the final adoption of the specification.

Specification No. 16, appearing on page 8, refers to the use of adjustments. The suggested wording is as follows:

Use of adjustments.—No adjustments of the delivery of a defined-stroke liquid-measuring device shall be permitted, except that intended to produce a piston displacement per cycle of 231 cubic inches per indicated gallon of delivery. Adjustments of piston displacement to correct for leaks, slippage, excessive length of pipe line, or other defects of the installation shall not be permitted.

No change of consequence has been made in the original specification No. 22.

The Acting Chairman. Is there any discussion of this specification? [After a pause.] If not, it will be the consensus of opinion of the conference that such specification is adopted and approved.

Mr. Holbrook. The next specification refers to "Diversion of measured quantity." The original specification, No. 18, read as follows:

There shall be no direct or continuous connection or device adapted to return any portion of the measured liquid from the discharge pipe or outlet of any liquid-measuring pump to the supply tank or pipe of the same. All valves in the suction line which are intended to prevent the reversal of flow of the liquid must be of such design that their closure is automatically effected in the use of the pump.

Old specification No. 5 referred to the "Closure of one outlet" and read as follows:

When two discharge outlets for the liquid are provided on a liquid-measuring pump, the pump shall be so designed and constructed that one outlet must automatically be tightly and completely closed off whenever the other is open, so that no liquid can be discharged except through that outlet which is in use at the time and for the purpose intended.

In the opinion of the committee these two specifications were identical in their purpose, and both were intended to prevent the liquid from going to more than one place at one time, whether the places be two outlets or whether it be a diversion from the measuring chamber back to the tank. Therefore, the two specifications which have been read—old No. 18 and old No. 5—have been incorporated in a new specification, which is now numbered 17, and which takes the heading "Diversion of measured liquid." This specification reads as follows:

All liquid-measuring devices shall be so designed and constructed that no portion of the measured liquid can be diverted from the one discharge outlet through which delivery is being made or to be made during the operation of the liquid-measuring device.

This specification is to be construed to require that there shall be no means provided by which any of the measured liquid can be diverted from the measuring chamber or the discharge line to the supply tank or elsewhere, during the period of operation, and that all valves in the supply line intended to prevent the reversal of flow of the liquid shall be of such design and construction that their closure is automatically effected in the use of the device. Also when two or more discharge outlets for the liquid are provided all outlets except the one in use must automatically be tightly and completely closed off during the period of discharge: *Provided, however*, That the above shall not apply to the drain outlet from the filtering chamber when such outlet is in plain view of the customer.

The last proviso is new and must be incorporated if the filtering chamber is to be continued, and I think there is no question but that the filtering chamber is a necessary part of the pump.

The Acting Chairman. Are there any discussions or objections to that specification? [After a pause.] If not, it will be the consensus of opinion of the conference that the specification is approved and adopted.

Mr. Holbrook. Inasmuch as we are to continue the consideration of certain of these specifications to-morrow morning the committee asks the indulgence of the conference and suggests that we pass over specification No. 18 at the present time.

The Acting Chairman. If there is no objection, such will be the order.

Mr. Holbrook. Specification No. 19 has reference to drainage of discharge piping. The recommended wording of the committee is now as follows:

Drainage of discharge line.—All liquid-measuring devices shall be so constructed and installed that they will provide for the complete and rapid drainage, to a definite and uniform level, of the liquid contained in the hose or outlet pipe, and will not permit a siphoning or a continuous trickle of liquid from the discharge outlet after the operation of the mechanism is discontinued.

This specification will be construed to require that if hose is used its inlet end shall be at least 5 feet above the normal level upon which the receiving vehicle or vessel stands and the liquid-measuring device shall be equipped with a vacuum breaker or equivalent means to insure the complete and rapid drainage of the hose that is required by the above. The hose shall be properly reinforced and shall be of such length and stiffness that no movable portion thereof will be readily disposed in such a way as to tend to retain liquid after the operation of the device is completed.

While this specification has been entirely reworded the principal changes which have been made are in the interest of clarity. Instead of an indefinite height of standpipe, which would be variously interpreted by the different inspectors of weights and measures, it is suggested that the minimum height of standpipe be at least 5 feet. In the opinion of the committee that is the only change of importance which has occurred in the rewording of the specification.

The Acting Chairman. Is there any discussion of this specification?

Mr. Ramsdell. Mr. Chairman, we would like to call attention to the last line, or the last few words, reading:

After the operation of the device is completed.

Before the hose is drained the buyer may say his tank is full and ask the operator to stop. There would still be some gasoline in the hose, and we would suggest, to cover a case of that kind, that these last few words be struck out.

Mr. Holbrook. Mr. Ramsdell, we did not get your objection.

Mr. Ramsdell. Before the hose is drained the tank may be filled to the point of overflow, and the buyer will raise his hand and say "Stop." There is still some gasoline in that hose. What is going to become of it? It can not be delivered to the customer, because he will not take it. It seems to us that the wording "after the operation of the device is completed" would have to be eliminated to cover a case of that kind.

Mr. Holbrook. Of course, I take it that there is no question in your mind that in nine hundred and ninety-nine cases out of a thousand it will be possible and necessary to drain the hose in order to obtain full measure?

Mr. Ramsdell. There is nothing serious about it, Mr. Holbrook. It is just a situation that arises now and then and we want to call your attention to it.

Mr. Holbrook. But if a man stops a delivery suddenly—for instance, when there is an overflow of the tank, and the end of the hose may be elevated in such a way that the gas will not be spilled—it seems that is a special case which could not be said to be in violation of this specification. This specification simply requires that no part will be readily disposed, as the pump is operated, to retain liquid. There may always be some part so disposed. The reason the

word "readily" was added was because no two drivers will stop their cars in exactly the same position, and so there may be very often a loop in the hose. If the hose line is properly reenforced and not of excessive length, such things will not readily occur. I confess I do not see the objection to the words "after the operation of the pump is completed." Would it be better to say "after the operation of the mechanism of the device"?

Mr. RAMSDELL. We felt that if you put a period after the first word on the last line, "liquid," it would be just as strong. Bear in mind this is not a serious matter, but we feel that the last words there do not add a great deal to the strength of this particular specification.

Mr. SMITH. I believe the specification is worded correctly if we consider that the hose must drain after the operation and the device must be so constructed as to be drained after it is completed, when desirable to do so. If a case arises where the hose is filled with liquid all the time, the hose is not drained always, but can be drained when necessary.

The ACTING CHAIRMAN. Does that not clear that up?

Mr. RAMSDELL. Yes; it does.

Mr. NEALE. It seems to me the committee has the wrong word there in the paragraph at the bottom of page 10. The first part of that paragraph does not seem to require that there be a hose, but in the middle, after the word "hose," it is said that it is "required by the above."

I think it should read, "the hose mentioned above."

Mr. HOLBROOK. The words "required by the above" refer to "complete and rapid drainage." That can be corrected by putting a comma after "hose." That will make it read, "the complete and rapid drainage of the hose, that is required by the above." A comma, I think, meets that objection.

Mr. SCHOENTHAL. Ought not this second section be changed to require that the inlet end will be at least 6 feet above the normal level, etc.? I think 5 feet is rather low. In fact, it is lower than they are now building the pumps.

The ACTING CHAIRMAN. That matter was considered by the committee, in view of the fact that a great number of automobile trucks have their tanks elevated unusually high, but I contended that our experience has been that the 5-foot standpipe has met all of the purposes and intentions of the specification, and also has served to obtain the conditions aimed at. If we change that specification, it would mean the correction of 4,000 or 5,000 standpipes in my State alone. I do not believe it will justify it.

Mr. SCHOENTHAL. If I understand it, the specification reads:

> The end shall be at least 5 feet above the normal level upon which the receiving vehicle or vessel stands.

I take that to mean that this discharging point shall be measured, not from the tank but from the ground.

Mr. HOLBROOK. That is right. A 5-foot standpipe will operate to deliver gas into any pleasure car with a satisfactory slope of hose; the so-called "universal" car has a tank 36 inches high, and other cars vary, some being as high as 48 inches. However, the cars with tanks 48 inches high are usually very old models. I presume that the

majority of tanks in pleasure cars at the present time, outside of a most commonly used car, do not exceed 30 inches in height. It may be that a standpipe 5 feet high will not give a satisfactory slope to a few trucks which have tanks under the seat or in the cowl and are very much elevated from the ground. In the opinion of the committee, however, trucks less frequently buy their gasoline at filling stations than pleasure cars, because very often the source of supply to a truck is in the garage of the individual truck, where they keep a supply on hand and fill up every morning, buying their gasoline by wholesale, perhaps. The committee were unwilling to require a greater minimum height than 5 feet. If it is the consensus of opinion of the conference that 5 feet is not enough, an amendment to that effect can very readily be passed.

Mr. Stevens (representing Clear Vision Pump Co.). I would like to ask, in connection with this number, if the draining of the hose is to be taken up in No. 18 by the committee to-morrow?

Mr. Holbrook. Yes, sir; that is why No. 18 was postponed.

Mr. Fuller. I would like to ask if it is understood that this vacuum breaker shall be automatic? I have in mind several people who have installed these standpipes, and as they wanted to save expense they put in a hand-controlled vacuum breaker there. They sometimes forget to operate it, and thus they have the same old condition. It seems to me we should make sure in here that this is an automatic device.

Mr. Holbrook. I think your amendment will be satisfactory to the committee.

The Acting Chairman. Will you kindly make a motion covering that amendment, Mr. Fuller?

Mr. Fuller. I would like to make the motion that we put the word "automatic" before the words "vacuum breaker," and also before the word "means," so as to read, "equipped with an automatic vacuum breaker or equivalent automatic means."

Mr. Holbrook. If we have an automatic vacuum breaker, the equivalent must be automatic, so the one word will be enough.

Mr. Fuller. Yes.

The Acting Chairman. If there is no objection, I will assume that amendment is adopted and approved. Is there any more discussion or any further objection to No. 19? [After a pause.] If not, it will be the consensus of opinion of the conference that specification No. 19 has been approved and adopted.

Mr. Holbrook. Specification No. 20 refers to the height of the suction lift, and reads as follows:

Limiting height of suction lift.—No defined-stroke piston-type, liquid-measuring device shall be so installed as to work under a total suction head sufficient to cause vaporization of the liquid for which it is used under the highest temperature and lowest barometric pressure likely to occur.

The committee has no changes to suggest in the tentative specification adopted last year.

Mr. Barnard. I move its adoption, Mr. Chairman.

The Acting Chairman Are there any opinions relative to the specification in conflict with its present wording? [After a pause.] If not, it will stand approved as read.

Mr. HOLBROOK. Specification No. 21, original No. 14, reads:

Use limited to certain liquids.—Liquid-measuring devices which will not give correct results except when used with liquids having particular properties, as, for example, high viscosity, shall be conspicuously, clearly, and permanently marked to indicate this limitation. Such wording may take the form, "Not suitable for gasoline or light oils"; "Use only for molasses or heavy oils" or "For viscous liquids only.' '

The committee has no changes to suggest in this specification as originally adopted.

The ACTING CHAIRMAN. What is the pleasure of the conference with reference to this specification?

Mr. BARNARD. I move its adoption, Mr. Chairman.

(This motion being seconded, it was put to a vote and was agreed to.)

Mr. HOLBROOK. Specification No. 22 refers to computing charts. It reads as follows:

The value graduations on all computing charts used on liquid-measuring pumps shall not exceed 1 cent at all prices per gallon up to and including 30 cents. At any higher price per gallon the value graduation shall not exceed 2 cents: *Provided, however,* That nothing in the above shall be construed to prevent the placing of a special value graduation to represent each 5-cent interval. These special graduations may take the form of dots, staggered graduations, or similar forms. They shall be so placed that their meaning and value may be clearly understood, but they shall not be placed in the space between the regular graduations.

I may say that there have been one or two objections interposed to that specification, and these objections have received the attention of the committee. In the opinion of the committee it appears to be feasible to graduate these scales in the manner suggested, and if possible we think that the 1-cent should be shown in all cases, but where that is impossible the 2-cent graduation should at any rate be shown. I may say at this time that similar wording has been adopted by the conference in the case of computing scales.

The ACTING CHAIRMAN. What is the pleasure of the conference in regard to specification No. 22?

Mr. COREY. I will just ask the question whether this provision, speaking of 5-cent intervals, means that is in addition to 2 cents? That the 2 cents must be on that there can be no doubt.

Mr. HOLBROOK. The special graduation for 5 cents is specifically allowed in addition to the 2-cent graduations.

Mr. COREY. But not to replace the 2 cents?

Mr. HOLBROOK. No.

Mr. COREY. We only suggest that the 2-cent interval is getting it down pretty fine on a liquid selling at $3 or $5 a gallon.

Mr. HOLBROOK. Is it not getting it down pretty fine to talk about selling a $3 or $4 or $5 liquid to the purchasing public by means of a liquid-measuring pump?

Mr. COREY. Not at all.

Mr. HOLBROOK. Where the public is present at the sale? Do you anticipate that gasoline is going to that price, perhaps?

Mr. COREY. I do not, but these specifications are going to cover thousands of pumps which do not handle gasoline. They cover everything, from kerosene to the highest-priced varnishes, and liquids of that kind, and essential oils, and everything of that sort.

Mr. Holbrook. Do you ever anticipate that people are going to buy varnishes from liquid-measuring pumps? Are you contemplating liquid-measuring devices for use in industrial establishments for filling cans or something of that sort? These specifications are only intended to cover commercial installation—that is, where the customer gets his stuff directly from the pump.

Mr. Corey. Yes; exactly; that is what is done at the present time. Of course we are going to the extreme, I agree, when we talk about 2-cent or even 5-cent graduations on a $5 liquid; but just to develop that point, I have raised the point as to the necessity of 2-cent graduations on the extremely high-priced computed cost.

Mr. Holbrook. It almost seems to me that if $5 liquids are going to be sold through liquid-measuring pumps it certainly would not be satisfactory to have 4.6 inches per measured gallon in those cases. Do you presume $5 liquids——

Mr. Corey. They are usually handled through gallon pumps.

Mr. Holbrook. The gallon pumps usually have a very much greater interval than 4.6 inches per gallon on the vertical scale.

Mr. Corey. They run 12 to 14 inches per gallon.

Mr. Holbrook. I think you will get your 2-cent graduation on that. There is just as much necessity in figuring 2 cents on high-priced liquids as on low-priced liquids. Two cents is 2 cents, regardless of what you are buying.

Mr. Barnard. I move the adoption of Specification No. 22.

(There were several seconds to this motion; and upon being put to a vote, it was agreed to.)

Mr. Smith. If I may interrupt at this point, I would like to suggest the insertion of a new specification. The reason I offer it at this time is that I think probably it is the logical place for it to appear, if the conference sees fit to adopt it. We have guarded against the delivery of short measure very carefully. We have on the market one or two, perhaps more, types of machines which deliver in money value. It seems to me we should make some provision for the safeguarding of the purchaser where the machine in which he inserts a coin fails to function. In other words, if the tank is empty so he can not get a delivery when he inserts a coin, some means should be provided for protecting him when that happens. Either the device should so operate that he can not insert his coin when it is empty or else some device should be made to return the coin to him if the device does not function. I move that this be referred to the specifications committee and they be directed to frame a specification to be presented to the conference to-morrow covering this feature.

The Acting Chairman. Do you make that as a motion?

Mr. Smith. Yes; and I move its adoption.

(This motion being seconded, it was put to a vote and was agreed to.)

The Acting Chairman. The committee will take due cognizance of that matter, Mr. Smith.

Mr. Schoenthal. I fail to find anywhere in here anything that would tend to prevent the sale of short measure through these various pumps by reason of continuous dripping, which occurs very frequently in the case of pumps that are used for lubricating oils. It strikes me there ought to be something in here—it may be covered,

but I have not seen it if it is—that would cover that by requiring an antidrip nozzle, something that will automatically shut off the flow after the delivery of the full measure.

The ACTING CHAIRMAN. It is rather difficult to comprehend what you have in mind on this for presentation. Will you not kindly prepare in substance the character of specification which you would like to introduce, so we can have the wording of it, and properly discuss it? You have the idea clearly in mind, and you can put it in such shape that the conference can discuss it. Will you not do that and have it ready to-morrow?

Mr. Smith, will you not kindly confer with Mr. Reichmann and do the same thing in regard to your specification?

Mr. SMITH. I have a suggested wording here which covers part of it, but I thought the conference committee could do a better job.

The ACTING CHAIRMAN. Suppose you complete it and present it to-morrow.

Mr. SMITH. I will do so.

Mr. HOLBROOK. Specification No. 23:

Fraudulent construction prohibited.—All liquid-measuring pumps shall be of such construction that they are not designed to and may not be used to facilitate the perpetration of fraud.

The committee has no changes to suggest in this specification as originally adopted.

Mr. BARNARD. I move the adoption of the specification.

(This motion being seconded, it was put to a vote and was agreed to.)

Mr. HOLBROOK. Specification No. 24 is the original wording of old 29:

Metric system.—No specification contained in the preceding pages shall be understood or construed to prohibit the sale or use of liquid-measuring devices constructed or graduated in units of the metric system.

The tolerances to be allowed on any liquid-measuring device constructed or graduated in units of the metric system shall be the same as those specified on similar apparatus of any equivalent size or at an equivalent capacity in the customary system.

The committee has no changes to suggest in this specification as originally adopted.

The ACTING CHAIRMAN. Before adopting this specification, I would like to inquire whether it has been referred to the American Institute of Weights and Measures.

Mr. HOLBROOK. I presume the American Institute of Weights and Measures is familiar with its provisions.

(The adoption of this specification being moved and seconded, it was put to a vote and was agreed to.)

Mr. HOLBROOK. Two specifications as originally adopted remain. The first is original specification No. 20, entitled "Protection against corrosion," which reads as follows:

In the case of liquid measuring pumps which depend for the accuracy of their measurement upon the tightness or perfection of seating of a valve or valves, the material used for tanks, piping, and all such auxiliary apparatus as may contain liquid, including the pump itself, shall be of such nature and properties as to be free from the likelihood of corrosion or rusting or the liberation of particles which will be likely to impair the tightness or correctness of seating of such valves.

In considering this specification, the committee requested opinions from various metallurgists and chemists as to the meaning of the same, and there was so much confusion in the ideas of the various people consulted that the committee deemed that it was inadvisable to continue the specification in our list, inasmuch as we are unwilling to specify materials which would be satisfactory and materials which would not be satisfactory. The committee therefore recommends that this specification be deleted.

The Acting Chairman. What is the pleasure of the conference regarding the action of the committee in this respect?

Mr. Barnard. I move that the recommendation of the committee be adopted.

(The motion being seconded, it was put to a vote and was agreed to.)

Mr. Holbrook. The next specification is original No. 24, which reads as follows:

Position of operating handle.—(*a*) In all defined-stroke, piston-type, liquid-measuring pumps the initial or starting position of the operating crank or handle shall be defined by a latch or snap which will operate to hold the handle accurately in that position when the apparatus is not in use.

(*b*) The initial position of the handle on all types of defined-stroke, piston-type, liquid-measuring pumps shall be vertically downward. Handles which in their starting position are inclined to the vertical or stand vertically upward shall not be permitted.

In the opinion of the committee it would be very satisfactory if it could be accomplished, that all handles start from the same position, inasmuch as there would be a considerable protection to the purchaser from such an accomplishment. However, in the opinion of the committee it is deemed that the difficulties imposed on the manufacturers are such that the benefits to be derived would not compensate for the difficulties encountered, and therefore the committee recommends that this specification also be deleted.

The Acting Chairman. If there be no objection on the part of the conference, such will be the order.

Mr. Holbrook. The final paragraph in the report relates to tolerances. It was originally worded as specification No. 25. In the rewording it has been merely headed "Tolerances," since it is the practice of the conference in adopting specifications and tolerances to adopt them separately, tolerances not being considered as a specification. We have suggested the following rewording:

Tolerances.—The tolerance to be allowed in excess or deficiency on all liquid-measuring pumps shall not be greater than 2 cubic inches per indicated gallon: *Provided, however,* That the manufacturers' tolerances or the tolerances on all new liquid-measuring pumps shall not be greater than one-half of the values given above: *And provided further,* That these latter tolerances shall also be applied to all pumps which are being retested after being found incorrect and subsequently adjusted or repaired.

The only change in that paragraph is the change of 1.8 cubic inches to 2 cubic inches. The reason for the original 1.8 cubic inches was that the tolerance was originally provided in even liquid ounces, and the cubic inches were secondary. It appears to be now the case that most of the inspectors of weights and measures work in cubic inches rather than liquid ounces. It therefore seemed to be better to have an even number of cubic inches instead of odd numbers in the series

of tolerances; they can be much more readily remembered. Nearly all the old tolerances split the line to one-tenth of a cubic inch. This will simply require 2, 4, 6, 8, 10 cubic inches or 1, 2, 3, 4, 5 cubic inches.

A DELEGATE. The word "devices" comes in there instead of "pumps."

Mr. HOLBROOK. Yes.

The ACTING CHAIRMAN. What is the pleasure of the conference with regard to specification No. 25?

Mr. NEALE. Mr. Frary, of South Dakota, says it is indefinite in his mind when a liquid-measuring device is "new" and when it is "old." He thought it would be more definite to say, "at the time of installation." The inspector, if he finds the pump just installed that day, will assume it is a new device. Will it still be a new device six weeks from then or 12 months from then, if the inspector did not get there in the meantime?

The ACTING CHAIRMAN. Personally I draw the conclusion that the apparatus would be new until its first inspection.

Mr. NEALE. Suppose something should happen that it was not inspected for six months?

The ACTING CHAIRMAN. I would still construe it to be new. I do not think that is a very important point.

Mr. HOLBROOK. Formerly we have defined "old apparatus" as that apparatus which has been put in use and used for some time. It is a rather hard thing to determine. I think the inspector in the field, upon the ascertainment of the length of time the device has been used, in those States in which the installation is not inspected before it can be used at all, must use his judgment as to whether it has been used for such a length of time that it takes the old or new tolerance.

Mr. NEALE. I move the adoption of the specification.

Mr. BARNARD. I second the motion.

(The motion was put to a vote and was agreed to.)

The ACTING CHAIRMAN. We will now refer back to Specification No. 9. Mr. Bean, will you kindly demonstrate now to the conference the employment of your device?

(Mr. Bean thereupon demonstrated to the conference the liquid-measuring device employing the scale with sloping lines discussed on p. 88 et seq.)

PRESENTATION OF GAVEL TO THE PRESIDENT OF THE CONFERENCE, DR. S. W. STRATTON.

Mr. JOHNSON (ACTING CHAIRMAN). Before this session adjourns I have a pleasant duty that I desire to dispose of. I believe that there are present representatives of all the States attending the conference, and consequently we can do this thing at this time feeling that there is a complete representation of delegates.

Very few of the delegates who have attended this conference have ever stopped for a moment to contemplate the serious efforts and the great amount of work which must be exercised and put forth on the part of the Bureau of Standards to convenience the holding of this conference, which, from my point of view, does not in any great degree reflect toward the efficiency of the bureau. On the contrary,

this is an institution intended to build up the efficiency of the representatives having in charge the enforcement of the weights and measures laws throughout the United States so that they can go back into their jurisdictions and do this work in a competent and efficient manner, and in a manner which will justify public confidence and also justify the expense attending the enforcement and the operation of these laws. We accept whatever the conference provides in a sense of being fully and duly entitled to it. I doubt very much whether we for a moment contemplate the burden of responsibility that rests upon the officials of the bureau and especially upon the director. It must be a great deal of concern to him, in addition to his enormous diversified duties, to prepare himself upon the particular subject of weights and measures in order to come before this body of men and act, I may say, as an attorney general on the subject of weights and measures for the entire United States. I have been conscious of that condition and sometimes have hoped that the opportunity would present itself whereby the delegates coming here could in some proper manner express their appreciation by the presentation to Dr. Stratton of some proper and appropriate token—not something of any particular intrinsic value, but something with a fundamental value. With that purpose in mind, the delegates have selected a committee to do this thing this afternoon.

We think that of all of the functions coming under Dr. Stratton's jurisdiction as Director of the Bureau of Standards, perhaps the supervision of the branch having to do with weights and measures is the nearest and dearest to his heart. We have a right to presume that, for, so far as I am concerned, and I believe I am speaking for all the delegates, we know Dr. Stratton only as being the Director of the Bureau of Weights and Measures. We concern ourselves with that institution and we sometimes consider that the only function of the Bureau of Standards is the function in matters appertaining to weights and measures.

Many, many years ago when the Government first adopted a system of weights and measures, there were transmitted to this Nation from England copies of the English standards. These copies were transmitted in a very fine and carefully prepared case made from the finest specimens of hardwood. The standards, of course, are still intact, although they are no longer used and have only a historical value, but the case has been broken up, and from the wood in that case we have caused to be manufactured a gavel, which it now becomes my happy and pleasant duty this afternoon to present to Dr. Stratton, so that in years to come, when I will not be here and many of you will not be here, the gavel will still remain as an emblem of authority and power in conducting the deliberations of this very important body.

We make this presentation, as I said before, not with any purpose of transmitting anything of intrinsic value, but to convey to him an expression of our high and sincere appreciation for the most technical, the most scientific man who, I believe, is to-day in the employ of the national Government. Therefore, Dr. Stratton, on behalf of the delegates, I take this occasion to present to you this gift.

Dr. STRATTON. Mr. Chairman and delegates, your chairman is right in his assumption that my chief interest in the bureau lies in the

Division of Weights and Measures. This is true because of many causes. In the first place, that is the foundation of our system of measurements. In the second place, our commercial weights and measures are perhaps the most important weights and measures in the country. I happen to be a member of the International Committee on Weights and Measures which has to do with that question for the entire world so far as it relates to the preservation of original standards.

You will be interested to know that from the very beginning of the science of metrology people have endeavored to connect up the natural standards. We have ascertained the period taken by the earth in rotating about its axis, and can figure that to the day, hour, minute, and second—we usually speak of the second as being the standard. We can with suitable instruments get the time anywhere. You can not destroy the standard of time in any manner. Scientists for years have proposed a natural standard for length. In the days of Thomas Jefferson, it was proposed to adopt the length of the second's pendulum as a standard unit of length. Another proposition was made a number of years ago that we use the wave length of light. Twenty-five or 30 years ago an American scientist went to Paris and actually determined the length of the meter in terms of this unit.

The meter is the fundamental standard of all countries except Great Britain; that is, the actual working standard. I mean by that that when we take the meter here as the standard of length we determine the relation between the meter and the yard, and that gives us all of the accuracy of the metric standards. It is exactly as if you change a sum of money from the pound sterling into dollars, or vice versa. If you have one unit, you can convert it into the value of the other, and that is the way we convert the standards. This determination of the meter in terms of light waves was done successfully by Prof. Michaelson, and it has been repeated by French physicists, within an error of perhaps two or three millionths of an inch, so that to-day we are absolutely independent of any material standard of length. It happened to be my good fortune to propose to the international committee that the wave length of light be taken as the fundamental standard. This proposal met with great favor, but they all felt that it ought to have more of a try out. During the war, as you know, we were cut off from nearly all importations, and munitions makers, machinists, and manufacturers generally were using as their standard of length block gauges that were made in Sweden. These block gauges were stacked up one on the other and their total thickness measured. That meant that they had to be very accurate as to length. In our optical department we had been studying methods of measuring by light waves, and Mr. Fischer had been studying the preparation of these gauges, so that, when we had just entered into the war, we were prepared to make and standardize these gauges here, and they were compared to the wave length of light, and we determined their measurements in this manner. If all of our yards and all of our meters should be destroyed, it would be a very simple matter in a physical laboratory to reproduce them all when we have the standard of length put on that basis. That is one of the reasons why I am very greatly interested in the question of weights and measures.

Now, I appreciate very much this gavel, because it is a thing that we have needed. I think some of you must have noticed that we needed this in our meetings, but we do not need it now nearly as much as we needed it previously. I sincerely wish I had had this in the first four or five meetings, except that it should have had a longer handle and been furnished with several detachable heads that I might have thrown them at some of you. What pleases me even more than the gavel is the fact that to-day you have been here discussing these specifications in the manner which was intended in the first place. Here we have a body of men from all over the country concerning themselves with gasoline pumps, a tremendously important matter and one which affects every family in the land; and the manufacturer and the user have sat down here to-day and put all their cards on the table and discussed these things as gentlemen. To my mind that is the great achievement of this conference, and that is what we wanted to do. There is nothing that pleases me more here to-day than the way in which you have gone about this organization.

The ACTING CHAIRMAN. If there be no further matters appertaining to the subject of the specifications, or any other matters, we will stand adjourned.

Mr. REICHMANN. I have a telegram from a gentleman whom most of you know and who has attended every conference we have held before and who is a former vice president of this organization. A number of the delegates sent him a telegram, telling him that we missed him and would like to have him attend. The telegram is as follows [reading]:

BOSTON, MASS., *May 24, 1920.*

Dr. FRITZ REICHMANN,
National Conference Weights and Measures, Bureau of Standards.

Impossible to leave here. Appreciate greatly your kind expression. Wish you best conference ever held. Boost inspection work; never before so important; forget modesty, public must be shown. They are slow to appreciate, but it is bound to come. Regards to everybody. See you at Albany.

D. C. PALMER.

The ACTING CHAIRMAN. Before adjourning Dr. Stratton wishes me to announce that the conference will adjourn to-morrow afternoon at 2 o'clock, if it is so desired.

There being no other matters to come before the conference, we will now adjourn until 9.30 to-morrow morning.

(Whereupon, at 5.15 o'clock p. m., the conference adjourned to meet at 9.30 o'clock a. m., Wednesday, May 26, 1920.)

FIFTH SESSION (MORNING OF WEDNESDAY, MAY 26, 1920).

The conference reassembled at 10.20 o'clock a. m., Dr. S. W. Stratton, chairman, presiding.

WEIGHT STANDARDIZATION OF BREAD, BY CHARLES C. NEALE, COMMISSIONER OF WEIGHTS AND MEASURES, STATE OF MINNESOTA.

Mr. Chairman and gentlemen, a period of practically 50 years in Minneapolis, the beautiful "Flour City," located in that section of the country that has been aptly called "the world's granary," should have perhaps equipped me somewhat to present a readable paper under the program title, but when it came to the proposition of handling the subject before this rather critical—but, I will add, friendly critical—conference it seemed to me that I did not know what flour and its bread forms really were.

However, during the last 10 years of weights and measures work I have made some personal observations that have led me to certain conclusions, which I will try to sustain in this paper.

The familiar expression, "the staff of life," is as true to-day as it ever was, and perhaps more so, as applicable to bread, and it is figured that more than 85 per cent of all white flour reaches the ultimate consumer in the form of the familiar loaf of bread.

Now, it happens quite often in the work of weights and measures supervision that the trend of public opinion is learned or sensed by a department of weights and measures even before it reaches the manufacturers themselves, particularly as regards the weights and measures of foodstuffs, and my first observation to record is that in my experience there has been quite a general and continually recurring inquiry from the housewife as to why there is not established a standard weight for bread in loaf form.

Over and above the two leading questions involved in the problem, whether to reduce the weight of the loaf or raise the price of the loaf to meet the exigencies of trade conditions, there is always a suspicion on the part of the great mass of consumers that, in the absence of legally established bread-loaf weights, it is an easy matter to work a gouge both ways, to wit:

Reduce the weight of the loaf and raise the price of the loaf at the same time to suit the fancy of the baker.

It may be that competition would not permit such a public disaster to endure forever, but the busy public does not always take time to analyze such matters, hence it is very easy to build up an unfair prejudice against any particular trade, if the public feels that proper protection is not afforded. And, indeed, with prices now apparently high enough on the loaf, at least in public opinion, and with not much chance of becoming less in the future, it is quite disconcerting to find the loaf of bread in many cases shrinking to the proportions of a good-sized biscuit

As to the workability of the proposition on the part of the baker, I think it is well proven that it presents no great difficulties, because modern baking machinery is adjustable to a degree of accuracy that will assure weight results easily within any fair tolerance established. Again, if the establishment of standard weight for bread in loaf form were hurtful to the baker's business, how did they survive during the period of control by the United States Food Administration, when a unit weight was fixed and insisted upon?

I am further informed that it would in fact be a matter of manufacturing economy if all were on the same footing as to uniformity in weight of the loaf, as it would then be possible to use standardized equipment, a very desirable feature in any manufacturing business, and with the weight proposition taken care of, it might be said that it would leave more time for attention to the important matter of quality, as well as time for determining what the price of the loaf must be, part of which time must now be spent in weight juggling and perpetual brain storm in an effort to bake a 14-ounce loaf that will look as large as a 1-pound loaf, and thus resort to camouflage to make it attractive to the customer both as to size and price.

There is evidence enough to show that the bread-weight proposition is sure to come, and this evidence consists of both State and city laws on the subject that are now coming into existence, and if all of them are not more or less defective, it at least can be said that they do not agree, and I know of no two city ordinances or State laws on the subject that have the same provisions. Hence it must follow that the troubles of the baking trade can not be made less by a variety of laws and ordinances which are as different as the varieties of understanding possessed by the law-making bodies that enacted them.

But the situation is here and must be met, and in my opinion the only cure is to standardize the weight of bread loaves, thus meeting the present public demands, giving the baking trade something uniform to work to, and thereby control, to a great extent, the matter of unfair competition, and also enable the trade to escape the pestering that results when a manufacturer is called upon to meet the requirements of differently constructed laws on the same subject matter that affect his business.

A good example of this situation exists in Minnesota. The cities of St. Paul and Minneapolis, having a total population of about 630,000, are solidly built up to the city line of each other. Each city has a bread-weight ordinance of its own neither one agreeing with the other, and this would mean, if the ordinance were being enforced by the local authorities, that the bakers of either city would have to be very careful not to cross the invisible dead line, because compliance with their own city ordinance would not mean compliance with the ordinance of the adjoining city covering the same subject.

To show that the spirit of legislation and ordinance making along the lines under discussion in this paper is a present-day affair, we may state that the Minneapolis and St. Paul ordinances here referred to were both enacted only about two years ago.

What may be found as to variation between city ordinances on the subject very likely exists as between States, which presents an intolerable situation when covering a commodity of such importance.

It is not my intention to here propose what the established weight of loaves should be, nor deal with the matter of tolerance, as others who are better informed can attend to that, but I will say that I am opposed to the proposition of labeling, and as I see the matter, a legally established weight on loaves of bread would do away with the necessity of stickers, labels, and other means to indicate the weight.

The labeling of so many units must be an expensive manufacturing feature in itself, when designing, printing, and actual affixing is considered, and all of this must be paid for by the consumer. It seems that this would not be necessary if loaves were standardized as to weight.

I think the sanitary feature may also be considered, as regards labeling, because while I admit that it could be done in the modern factory in a sanitary way with machinery it has always been a question in my mind as to both material and methods used by the poorly equipped bakeries in attaching labels and other insignia.

If it becomes necessary to fix the responsibility as to who made the loaf, it seems to me that this could be easily done by having the manufacturers name or identifying mark appear on each loaf by the simple expedient of having an embossed lettering in the baking pan leave its impression on the finished product, as is being done by certain bakers now.

From the best information which I can obtain, it would appear that the baking trade in general, that is, those who can read the handwriting on the wall, are strongly in favor of the weight standardization of bread, and, indeed, Mr. Charles B. Thompson, editor of the Bakers' Review, one of the leading authorities on the subject, has advocated the weight proposition for the last 15 years.

To sum up, then, I here enumerate what seems to me to be some of the great advantages to be gained by the weight standardization of bread.

1. The meeting of the demands of public opinion.
2. The controlling of unfair competition.
3. The securing of greater efficiency and economy in baking.
4. The placing of bread as the "staff of life" upon a secure basis where a loaf of bread means a legally established weight, and the same weight for rich and poor alike.

APPOINTMENT OF COMMITTEE ON WEIGHT STANDARDIZATION OF BREAD.

Following the reading of the above paper, some discussion was had on the subject matter thereof, and a motion was made and seconded to the effect that the chairman appoint a committee on weight standardization of bread to study the matter and make a report to the next conference, this report to include, if deemed desirable, proposed legislation on the subject. This motion was adopted by the conference.

In pursuance of the instruction contained in the motion, the chairman appointed the following to serve as the committee: Mr. Charles C. Neale, of Minnesota, chairman; Mr. D. W. Gregg, of Texas; Mr. A. W. Schwartz, of New Jersey; Mr. Guy G. Frary, of South Dakota;

Mr. F. G. Barnard, of Battle Creek, Mich.; Mr. Charles M. Fuller of Los Angeles, Calif.; and Mr. Leo S. Schoenthal, of the District of Columbia.

NET WEIGHT, BY CHARLES G. JOHNSON, SUPERINTENDENT OF WEIGHTS AND MEASURES, STATE OF CALIFORNIA.

Mr. Chairman, delegates, and visitors, it is again my happy privilege as a weights and measures official to address you, and this time with a greater sense of satisfaction, for I recognize this as a splendid opportunity to express myself on a subject which I consider paramount in importance to all matters coming within the labors of our institutions.

My views and opinions are based not upon experiments and theory but the result of many years of practical experience and serious concentration. The first and most important duty of a weights and measures official is to maintain and safeguard the highest possible standard of accuracy in the weighing and measuring devices employed in his jurisdiction. To accomplish this he must have an intelligent and practical knowledge of specifications and tolerances and must ascertain conditions by actual employment of standards.

The standards used in our inspection and testing work are to us like the compass to the mariner; they indicate our course of procedure and determine for us the conditions of the apparatus which it becomes our duty to safeguard or correct as the case may require, thereby protecting and maintaining the accuracy of our national systems of weights and measures.

These systems are not alone of great national commercial importance, but they form the foundation of our commercial structure in our trade relations with the world. Accuracy and the permanency of accuracy are to-day safeguarded in the manufacture of apparatus by the enforcement of our specifications and tolerances.

These safeguards, however, have only a limited effect upon the human equations which express themselves in the employment of weighing and measuring devices and which can only be regulated by education and restrictive law. The accuracy of the scale does not guarantee the honesty of the weight recorded.

The paramount problem which confronts us therefore is the development of the moral force; the building up of honest intentions. This is the cooperation which we seek. When it shall have been developed we will have accomplished that commercial integrity which must be the foundation of our system of commercial exchange. This integrity must express itself uniformly and must be strong enough to overcome and defeat all mental, commercial, and trade equations in conflict with the principle of net weight forming the basis for settlement in the sale and purchase of commodities, irrespective of character.

The principle of net weight forming the basis for settlement has the underlying principle which inspired the enactment to the national net-weight amendment. The principle of this law is uniformly subscribed to by all self-respecting commercial institutions, and it would be considered a most vicious practice to-day to include in the declaration of weight on a can of salmon, for instance, the weight of the container.

If this principle is correct and accepted by responsible packers of commodities in containers, why should the principle not be subscribed to by all persons selling any commodity by weight? It is just as reasonable for the weight of the barrel to be included in the weight of cottonseed oil as it is for the weight of the jar to be included in the weight of the jelly, and it is just as reasonable for the weight of the sack to be included in the weight of the walnuts as it is for the weight of the wooden spool to be included in the weight of the hemp rope.

The enactment of the weights and measures laws and their enforcement is calculated to suspend and eliminate all trade customs and trade practices which conflict and defeat the principle of net weight. If these purposes are not accomplished, the fault does not entirely lie with the commercial institutions practicing them, but with the weights and measures officials who permit them to be practiced. The fundamental purpose of weighing is to obtain a truthful record of quantity on which to base the exchange of the commodity for money value. On the truthfulness of such record depends the honesty of the selling transaction, and it was for the purpose of safeguarding the truthfulness of weight records forming the basis of settlement that the weights and measures laws were enacted. True net weight is the foundation upon which our system of commercial exchange must rest, notwithstanding trade customs to the contrary.

California law takes a firm and definite stand against the sale of commodities gross for net. This custom is regarded as a menace which defeats the principle of net weight. With reference hereto California law provides in part as follows:

> No person shall by himself or his employee or agent, or as the employee or agent of another, sell or offer or expose for sale any produce, article, or thing at, by, or according to gross weight or measure or at, by, as, of, or according to any weight, measure, or count which is greater than the true net weight, measure, or count thereof.

And also:

> When any product is sold subject to public weighmaster weights, such weights shall be the true net weight of the product. Net weight within the meaning of this act shall be the correct or actual weight of the commodity, excluding the weight of the container.

These laws express in definite and mandatory language the intentions of the legislature and delegate no privilege under any circumstances to the contrary. This department must, therefore, regard the enforcement of these provisions of law as its plain duty.

The record of weight forming the equivalent for money value must, therefore, be the true net weight of the commodity sold without evasions or reservations. Our standards of weight when forming the basis for settlement in money value are of equal importance to our standards of currency. Trade customs demanding privilege in conflict with these provisions of law must be defeated.

To include in the weight forming the basis for settlement the weight of the container is an erroneous departure from the principle and against it the law takes a stern and determined stand. To compromise the principle of net weight is a violation of a fundamental which can only result in prejudice and injustice.

Grain sacks, fruit crates, berry crates, lug boxes, barrels, and other containers are items of utility separate and apart from the commodity which they contain, and their expense should be included in

the general cost of production and distribution or as a separate charge or prorated in proportion to service obtained. Under no circumstances should they express themselves in the weight of the commodity they contain where such weight forms the basis for the sale of the commodity.

All import duties are assessed on the net weight of the commodity imported, exclusive of the weight of the container or packings in which they arrive. This net weight is determined by actual weighing by Government inspectors, who transmit to the merchants their net-weight records, yet these merchants attempt to defend their sale by gross weight solely because it is their trade custom. Net weight means the true quantity for which the seller has a justifiable claim in money value. A false record of weight is the direct cause of commercial misconduct. Pounds and ounces must be considered as equivalent to dollars and cents.

In determining net weight we concern ourselves with the gross and tare weights. The same degree of accuracy must express itself in obtaining the gross as the tare. There are two distinct kinds of tare weights, one being the free container necessary in transporting and delivery and the other that of carriers, vehicles, and such other containers as do not transfer in the sale of commodities. The common law of equity regulates the latter; it is the former which demands our concern and vigilance. If the tare of free containers be included in the weight of the commodity, you can not protect the consumer or the purchaser against the practices which the weights and measures laws are calculated to defeat.

We have here, again, for consideration the net-weight principle of the net-container act. Grain and all other farm products in California are marketed in hemp sacks of a uniform size and weight. The weight of these containers up to a few years ago was always included in the weight of the commodity, forming the basis for settlement. It was no easy matter to obtain the cooperation of the producers of the State to recognize the net-weight principle in the sale of grain, beans, rice, and other farm products.

Their contention was based on the apparent fact that it meant a sacrifice on their part of their equity in the containers, which at the time of promulgation of regulations had a market value of approximately 27 cents. When their attention was called to the fact that they could hold the value of their sacks in the sale of their commodity in an amount equivalent to the value of three-fourths of a pound of the commodity which they contained they realized that they were making no great sacrifice. They realized the fairness of the regulations, for they afforded them the necessary opportunity to protect their equity in the sacks.

It was customary for the mills to resell the sacks as second handed to the producers at approximately 65 per cent of the price for new sacks. The sack transfers by agreement or at an agreed-upon price and is no longer considered an integral part of the commodity sold.

Upon leaving Sacramento, a conference was held with representatives of the San Francisco Grain Exchange, warehousemen, and producers, at which they signified their approval of the net-weight principle and pledged their sincere intentions to rigidly adhere to and observe the net-weight principle in the sale and purchase of grain and other farm produce, interstate and foreign.

This cooperation calls for our vigilant enforcement of the principle in so far as our powers permit against the sale of commodities in conflict therewith by interstate merchants.

California weights forming the basis for settlement in the sale or purchase of commodities must be the true net weights, and no other weights will be considered honest weights when they form the basis for settlement. This will be a fact in California even though it be the only State in the Union enforcing it, and interstate merchants doing business in the State of California must subscribe to this principle at least so long as I have the enforcement of the weights and measures laws.

The national net-weight amendment is limited to apply to food in package form. It is, however, not far distant when the underlying principle of this law will be extended to every commodity sold in containers whether it be corn beef or gasoline. It is just as important to protect the purchaser against fraud in the quantity in the sale of gasoline as it is in the sale of corn beef. This matter should be apprehended by the weights and measures officials and the pioneer work of the Department of Agriculture, by its enactment and enforcement of the net-weight amendment, should call for our cooperation under State powers to extend this principle to commodities in containers other than food commodities.

With this purpose in view the California net-container act at the last session of the legislature was amended to read as follows:

> The provisions of this act shall apply to foodstuffs and stuffs intended to be used or prepared for use as food or medicine for human beings, and shall apply to any commodity when sold, offered, or exposed for sale in containers.

We can without fear of serious contention approach this cooperation with a sense of security and satisfaction that only the power of right can provide. We must consider ourselves the custodians of these principles; we must consider ourselves responsible for the protection of commercial honesty and integrity in the determination of quantity; we must fearlessly approach and attack every practice that encroaches upon or defeats the principle of net weight, otherwise we fail in the purpose of our work and fail to justify public confidence.

Our service a few years back was confined to the inspection of apparatus; to-day we have a larger field for additional useful and practical work, namely, that of not alone causing scales and measures to be honest in action and correct in construction but to cause the persons who use them to be honest in their employment. This is of paramount importance, for does not the dishonest employment of an honest scale defeat the purpose of our work?

To effect a moral responsibility and to impress upon weighers the importance of weighing and the serious necessity for accuracy in weighing, I caused to be enacted in 1915 what is known as the "Public Weighmaster Act." This law practically covers the same ground as that covered by the United States Warehouse Act of August 11, 1916, and as amended July 24, 1919.

The California act requires that all persons who issue a warehouse receipt or a weight certificate of any character must qualify as a public weighmaster. By the enforcement of this law the State presumes to represent at time of weighing the future purchaser or the absent party. The department holds to-day bonds in the amount of

$1,600,000 guaranteeing the honest employment of scales and the honest record of weights of 1,700 certified public weighmasters.

A uniform certificate known as the State certificate of weight and measure has been adopted, which certificate must make record of the true net weight of the commodity weighed and every public weighmaster understands that true net weight means just what the words imply—a truthful statement of the actual weight of the commodity exclusive of any foreign element which is not an integral part thereof. It means honest weights without any evasions; it means commercial integrity; it means obtaining and maintaining the principle of net weight as one of the fundamentals of our service which justify public confidence and the expense of our service.

Net weight means honest weight in the commercial sense. The exchange of commodities for money value by gross or any weight other than by net weight defeats the principle on which our service was conceived and established.

THE STANDARDIZATION OF CONTAINERS FOR FOODSTUFFS AND THE MARKING OF THE WEIGHT OF COMMODITIES IN PACKAGE FORM, BY A. W. SCHWARTZ, ASSISTANT SUPERINTENDENT OF WEIGHTS AND MEASURES, STATE OF NEW JERSEY.

Mr. Chairman, delegates, and guests of the conference, we are all interested in the very broad subject of standardization. Its application to everyday affairs, whether it be in the realm of manufacture, commerce, transportation, or any other thread that forms the warp and woof of our industrial fabric, promotes, as we know, an efficiency that can not without it be attained. The war forcibly brought home to us on this side of the Atlantic the fact that we were neglecting this all-important topic, due, no doubt, to our feeling of self-sufficiency and never realizing that our resourcefulness would be taxed to the breaking point. We were not, as a consequence, long in finding out wherein our deficiency lay, and though the lesson was costly it may, like the proverbial "ill wind," eventually do some of us a lot of good.

The subject assigned to me, therefore, namely, "The standardization of containers for foodstuffs and the marking of the weight of commodities in package form," I feel to be one of importance and deep interest to all of us, particularly when it is realized that the packing of foodstuffs is a daily growing industry and the people of the United States are gradually being weaned away from the old custom of buying their commodities in the loose state, or bulk. We can all remember when we took our "little brown jug" to the corner grocery for a gallon of vinegar or a quart of molasses; when we bought a pound of oatmeal instead of a package of it; a pound of soda crackers instead of a 4¾-ounce package of biscuits; when our cheese was weighed out for us instead of being handed over the counter in a jar or a foil wrapper, and so on; but these conditions are rapidly disappearing, and if things keep on in this respect there will hardly be an article bought but what will be in package form of some description. I might here go into a discourse on the effect this is having on our old bugbear high cost of living, for containers cost money, and packing food adds to its cost, but this would be getting away from my subject, and it is not my intention to take up

the time of the conference on a matter to which all of you, no doubt, have given considerable thought.

The standardization of containers and a change in the present system of marking commodities in package form would eliminate much of the confusion and opportunity of deception that now exists.

One of the greatest problems that confronts the weights and measures official is educating the buying public to protect itself. The housewife, through general indifference and lack of application, is responsible to a great extent for the perpetration of fraud in short weight and measure, and the people who can least afford it seem to show the least inclination to protect themselves.

So, if this follows in the weighing and measuring of commodities, how much more so does it apply to the purchase of goods in package form—not that the question of fraud may enter more prominently into the matter, except, perhaps, through slack-filled or mismarked containers, but the fact that the people do not stop to read the mark of weight placed thereon, being misled by what seem to be packages of similar size, and therefore these must, they think, be similar in amount of content. Two cans of salmon, for example, displayed in the windows of two merchants are placarded, one proclaiming a price of 18 cents, the other 20 cents; apparently equal in size as to can, but not, if the wrapper is closely examined, as to weight of contents. The housewife, as a rule, selects the cheaper priced can, thinking she is saving in her purchase, but not realizing that from 2 to 3 ounces more of contents could be had for the extra 2 cents. Of course, the argument is advanced that the public is getting what it pays for in the illustration just given, the question of quality being eliminated—but does it?

The standardization of containers and the marking of packages in pounds and multiples of the pound only, abolishing the odd ounces entirely, seems to be one of the solutions of the problem to help the public protect itself.

In the State of New Jersey, at the last two annual conferences of the State association of superintendents of weights and measures, the question of standardization of packages came up for discussion and resolutions were passed asking that Federal legislation be enacted to do away with the vast number of promiscuous sizes of containers extant.

Complaints have frequently been made by purchasers that the packages they received were not filled to capacity; we know this statement on their part to be true, and this is another matter wherein lies deception. Therefore, in dealing with the standardization of the sizes of cans and other containers, provisions should be made in any act introduced to make it mandatory for packers of foodstuffs to fill the various size containers to as near their carrying capacity as possible, consistent with keeping the net weight of the contents in conformance with the proposed pound or multiple thereof.

Our present system of having a can, bottle, or carton marked 3 ounces, 7 ounces, 11 ounces, 15 ounces, etc., is, to say the least, a polite way of saying to the profiteer, "Help yourself," for we know from investigation that the average person honestly believes that he is receiving one-fourth, one-half, three-fourths, or 1 pound of

commodity in the containers so marked, and we also know they are charged and pay for the goods at the pound rate and not the ounce.

It is believed that the sizes of containers should be such as to be easily identified by the consumer; in other words, the variation between sizes should be so easily apparent that there would be no question as to the quantity that was received.

The whole burden of the deception as at present practiced in the promiscuous sizes of containers in use falls heavily upon the people who can least afford it, comprising the inhabitants of tenement districts and the poorer quarters of cities, where illiteracy is not uncommon; it is to protect such as these and others who, as previously stated, through careless methods of buying, do not protect themselves, that such standardization of containers should be established.

The weights of the various vegetables in a State ready for canning have already been ascertained by the bureau of chemistry, I believe, and it should not be a difficult matter to establish sizes of containers for the different classes of vegetables, using the figures of the chemists as a basis for calculating the cubical contents that such containers should have.

The law covering marking (our net weight container law) is being generally complied with, but it has many times come to our attention that even with this good statute in force ways have been found to deceive the purchasing public, the most glaring practice being to underfill containers and subsequently mark them in some inconspicuous manner, so that their true contents can hardly be discerned without the use of a magnifying glass. We even found in New Jersey one case where a Jewish concern was putting out a commodity in cans with the contents marked in Yiddish hieroglyphics; of course, we stopped this the minute it was discovered, but it just goes to show the means that will be taken to mislead people, the perpetrators usually pleading ignorance of the law.

In New Jersey we standardized the peach basket, prohibiting the use of all odd sizes, such as 3, 5, 6, 10, 12, 14, and 15 quart sizes; also bottles for milk and cream were standardized, and no hardship was placed on the manufacturer, for it was not difficult to change the forms used to conform with the law. It seems that this would equally apply to the manufacturers of cans, bottles, and cartons if standard sizes were adopted by Federal legislation, and no hardship would be caused them in making the containers according to the regulations and specifications. Claims of hardship are, of course, always made when any innovation is introduced that may cause inconvenience to some one engaged in a particular branch of trade, but this does not exist long, as it has invariably been found that after things had really got to running smoothly there has not been one of our weights and measures acts that has not worked to the ultimate benefit of the manufacturer. For instance, with the adoption of our basket law the work of the makers was simplified, until at the present time they have but a few sizes to make to conform with our act; of course, they recognized the good points of the law from the first, and complied without any opposition, as standardization meant to them what it would mean to the manufacturers of other

containers—more efficient and economical methods of production. I want to say here that our basket law has worked out fine and the people in New Jersey are pleased with it. The basket situation I have taken as a criterion of what could be expected from the national standardization of containers. Of course, we will have opposition—all good movements do—but then it is worth while to make an effort, and the few who might rise against the enactment of such a standardization law would be more than overwhelmed by the number in favor of it, for, after all, it is a case of "the greatest good for the greatest number," a principle, gentlemen, which the New Jersey Department of Weights and Measures has always followed in their consideration of any legislation within the scope of its work.

One of the main features that our investigations have brought out is the unfair competition that at present exists between canners. They naturally try to undersell each other, and to enable them to do this the tendency has constantly been to decrease the size, and consequently the weight of the can or bottle or box of the commodity which they put up, or else to use an oversize container and put in underweight. From such who have followed these practices we may expect our greatest trouble in having a law enacted, but would it not be in line with the policies followed by weights and measures men all over the country to protect the man who is trying to treat the people right? We can do this by putting them both on the same working basis, just as we would start two runners at scratch in a race—and let the best man win. If he can not do it by fair means, we certainly should not allow him to use unfair methods, particularly when the ultimate consumer must pay for it, in receiving less than he reasonably expects and pays for.

The National Canners' Association, I believe, has already inaugurated a movement having for its aim the standardization of all cans used by the packers of canned products, and it certainly is a step in the right direction.

The present system of marking the net contents on commodities in package form is varied and rather difficult of comprehension to the lay mind.

It is proposed that we do away with the marking in pounds and ounces and make the marking in pounds and fractions, these fractions to represent common subdivisions of the pound, only, such as one-fourth, one-half, three-fourths, etc.

Cartons should be standardized in pounds and subdivisions thereof, the latter expressed in fractions, the same as for the cans and other containers, the said subdivisions to be not less than quarter subdivisions of the pound. Should this involve the increasing of the cost of packages of certain commodities now packed in cartons, on account of increasing them over the present small sizes, say of 2 ounces, 3 ounces, or less, it is felt that it would be far better for the public to pay the increased cost and be assured of the quantity they receive being all they pay for than under the present state of affairs, by which they are charged almost any price and still have no assurance of full weight. To give some concrete examples, I might state that in the city of Newark, N. J., on May 14 a visit was paid to the Army and Navy food station, conducted by the municipal authorities, and a survey of the canned goods made. The measurements of cans

and the marking of weight thereon were observed, with the following results:

California apricots, 1 pound 12 ounces; diameter of can, 3⅞ inches; height, 4⅝ inches.
Grape-fruit jam, 24 ounces net; diameter, 3¼ inches; height, 4⅝ inches.
Saur kraut, 6 pounds 6 ounces; diameter, 6 inches; height, 6⅜ inches.
Pumpkin, 6 pounds 13 ounces; diameter, 6 inches; height, 6⅜ inches.
Pears, 1 pound 4 ounces or over; diameter, 3¼ inches; height, 4⅜ inches.
Sweetened milk, 14 ounces avoirdupois; diameter, 2⅞ inches; height, 3 inches.
Sugar corn, 1 pound 4 ounces; diameter, 3¼ inches; height, 4 5/16 inches.
Concentrated tomato soup, 10½ ounces; diameter, 2½ inches; height, 3 13/16 inches; selling for 9 cents per can.

Nine different brands of canned tomatoes from Delaware, New Jersey, and Maryland were found, all of these being packed in cans 4⅛ inches in diameter and 4⅞ inches in height, and all selling for 14 cents per can. Five of these brands were labeled 2 pounds; two, 2 pounds 1 ounce; one, 2 pounds 2 ounces; and the remaining brand had a dual marking, 2 pounds 3 ounces at the top of the label and "Net weight, 35 ounces" at the bottom.

Five different brands of asparagus were examined, each being packed in the same size cans, square shaped; height, 6 inches; width, 2⅞ inches; and length, 3⅜ inches, and all sold for 35 cents per can. Four of these were labeled 1 pound 15 ounces, while the fifth was branded 1 pound 14 ounces.

The foregoing were all on sale at the food depot.

In one of the local stores the following were found:

Tomatoes, marked 1 pound 12 ounces; diameter of can, 3⅞ inches; height, 4½ inches.
Apple butter, 1 pound 1½ ounces; diameter, 2⅞ inches; height, 4⅜ inches.
Tomato cream soup, 1 pound; diameter of can, 2¾ inches; height, 4½ inches.
Lima beans, 1 pound 3 ounces; diameter, 3¼ inches; height, 4 5/16 inches.
Fancy shrimp, 5¾ ounces; diameter, 2 9/16 inches; height, 3¾ inches.
Green turtle soup, 4 ounces; diameter, 2 9/16 inches; height, 2⅝ inches.
Dill pickles, 1 pound 13 ounces; diameter, 3⅞ inches; height, 4½ inches.
California lima beans, 1 pound 4 ounces; diameter, 3¼ inches; height, 4 5/16 inches.
Maine corn, 1 pound 4 ounces; diameter 3¼ inches; height, 4½ inches.
Brussell sprouts, 1 pound 3 ounces; diameter, 3¼ inches; height, 4 5/16 inches.
Kraut, 1 pound 13 ounces; diameter, 3⅞ inches; height, 4½ inches.
Breakfast foods.—Prepared wheat: 1 pound 8 ounces; height, 8 inches; width, 2⅞ inches; length, 4¼ inches.
Prepared farina: 1 pound 12 ounces; height, 7⅝ inches; width, 1⅞ inches; length, 4½ inches.

And so on indefinitely.

No attempt was made to reweigh contents, or to figure out the capacity of containers in cubic inches. The sizes and varied markings as given are introduced merely for the purpose of illustrating the diverse methods used and the variance in contents of cans of same capacity, and serves as a forcible argument in the contention that a reform is needed and that standardization is the solution to the problem.

Our investigations have extended over a period of two years, and, in fact, were well under way previous to the conference of the New Jersey Weights and Measures Association at Atlantic City in 1918 when the resolution advocating the standardization of containers for foodstuffs was first introduced and adopted.

The propositions are feasible, unquestionably just, and should work out to the complete satisfaction of everyone. We in New Jersey, therefore, feel that the time is ripe for the introduction of such Federal legislation that will bring about the desired end in both the standard containers to be adopted for various commodities, and also for a reform in the present system of marking net contents.

DISCUSSION OF SPECIFICATIONS AND TOLERANCES FOR LIQUID-MEASURING DEVICES (Continued).[8]

The CHAIRMAN. We will now pass to the consideration of the specifications and tolerances for liquid-measuring devices.

Mr. HOLBROOK. The first specification which was laid aside yesterday was new No. 6, in relation to "Indication of delivery required," reading as follows:

All liquid-measuring devices shall be so designed and constructed that the amount delivered will be clearly and definitely indicated by automatic means, and the indication of any delivery shall take place only when the full discharge has in fact occurred.

In order to refresh the minds of the delegates, I will state that that was laid aside because of the proposition of the small flow, sometimes referred to as the dribble flow, which occurs when a piston pump is cranked back so that the piston reaches its initial position. At the present time the full delivery is indicated on the graduated scale before the dribble flow has been delivered, and the committee on specifications was instructed to draft a proviso to be added at the end of this specification along the lines of the proviso which I sketched out yesterday to take care of the matter. The committee now has the matter ready for presentation. The committee recommends that at the end of new No. 6 the following words be added:

Provided, however, That the requirement that the full discharge shall have been completed before registration shall not apply to the dribble flow caused by the displacement of the piston rod during the return of the piston to its initial position, when a clear statement conspicuous to the customer and adjacent to the indicating means is placed on the liquid-measuring device, to the effect that the full amount can not be delivered until the piston or the pointer or indicator has been returned to its initial position.

The CHAIRMAN. You have heard this report on the No. 6, which, as Mr. Holbrook has suggested, was deferred for further action. Are there any objections to this as read? [After a pause.] If not, we will understand that it is to be accepted.

Mr. HOLBROOK. The next specification laid aside was new No. 7, in relation to sensitiveness. The discussion on this specification had been practically concluded, as I understood it, when Mr. Barnard made the suggestion that the delegates would like to have in their hands, for consideration last evening, the specification as recommended by the committee. These specifications were available yesterday afternoon and were passed around to the members of the conference. If anybody has not a copy of the specification, there is an additional supply here. The specification as recommended by the committee reads as follows:

New No. 7—Sensitiveness.—All liquid-measuring devices shall be so designed and constructed that they can readily be operated to deliver each quantity for

[8] For text of specifications and tolerances as finally adopted, see appendix of this report.

which a graduation, stop, overflow pipe, or other indicating means is provided, within the tolerance on such amount hereinafter provided.

This specification shall be construed to require that in the case of all devices which have a graduated scale or dial or similar indicating means as the sole means of determining the amount of liquid discharged the length on the scale or dial equivalent to the tolerance at any graduation must be readily appreciable when the character of the indicating element and its normal distance from and position in reference to the observer's eye are taken into consideration, and in no case shall this length be less than 0.04 inch. For example, if a device is designed and constructed so that (1) 1 gallon is the first graduation; (2) there is no stop, overflow pipe, or other automatic means of terminating the delivery; (3) the graduations are equally spaced; and (4) if the cross section of the measuring chamber is the same throughout its length, the minimum length on the scale or dial shall be 4.6 inches per measured gallon, the maximum cross-sectional area of the measuring chamber shall be 50 square inches, and, if cylindrical, the maximum diameter must be 8 inches.

The CHAIRMAN. It seems to me this clears up the explanation of No. 7.

Mr. REICHMANN. That does not include the proposed amendment to this amendment that I gave the committee this morning?

Mr. HOLBROOK. No; that amendment was struck off, and copies are available here in the form in which you wrote it, Doctor.

Mr. REICHMANN. There is a form, on which your committee was agreed, which was different from that form. Is that available?

Mr. HOLBROOK. The final form is available.

Mr. BARNARD. Mr. Chairman, I would like to submit for the consideration of the conference the following amendment, after the words "less than 0.04 inch."

The CHAIRMAN. You refer to the document as distributed yesterday?

Mr. BARNARD. Yes, sir; the proposed new amendment by the committee. In line 10, second paragraph, strike out the period and insert the following:

except in the case of graduations representing less than 1 gallon on devices having a measuring capacity of more than 1 gallon, and in this case the minimum length on the scale or dial representing the first deliverable gallon shall be 4.6 inches.

Mr. HOLBROOK. To clear up the record, I may say that the committee has not passed favorably upon that amendment. Speaking for the committee, I think that I can say we think that sacrifices something, in that it does not require upon certain graduations representing less than 1 gallon the linear space which the committee has considered necessary in order to obtain deliveries within the tolerance on such smaller graduations. However, this only sacrifices that 0.04 of an inch in the case of graduations on large pumps or pumps of more than 1 gallon capacity that are less than 1 gallon in size; it retains that measurable amount on all gallon graduations and over. The committee feels, in the case of gasoline pumps, very few deliveries are made in amounts less than 1 gallon; the way the specification is presented it still requires that all graduations representing less than 1 gallon must be so placed that they can be read within the tolerance required.

Mr. REICHMANN. Mr. Chairman, several of the delegates—after having this other new form of No. 7, as distributed yesterday—carefully took up this matter, and in the light of what was for the benefit of the public, and what was in the line of good engineering practice,

and what was in the line of sound physics, adopted a form of amendment substantially similar to this. That was taken up by some dozen delegates in a meeting after the theater, and this morning submitted to the committee, and the wording passed about is the wording proposed by Mr. Holbrook, chairman of the committee, which we believe is satisfactory. I think these are the essential facts, and therefore, I rise to second Mr. Barnard's motion to insert that proviso in that section 7.

Mr. HOLBROOK. In order to keep the record straight, I must state here that this wording was prepared by the committee to accomplish the objects desired by Dr. Reichmann, but that the wording is only less objectionable than the wording originally submitted to us.

The CHAIRMAN. We must then decide between two amendments, the one which comes from the committee and the one which is offered from the floor?

Mr. HOLBROOK. No; this is merely an amendment to the specification recommended by the committee. There are not two amendments; there is just one amendment.

The CHAIRMAN. I do not put it in that form. I understand from your reading, you present a new form of No. 7, and these gentlemen have offered a variation in the wording.

Mr. RAMSDELL. It is not just clear to the manufacturers what is accomplished by this proposed amendment. In other words, we do not understand it. We would like to have that made clear, if possible, before you gentlemen take action on it.

The CHAIRMAN. We will refer to the committee's report as a change from yesterday, and to the amendment which these gentlemen have introduced.

Mr. RAMSDELL. We understand perfectly the new No. 7 as presented, but we do not understand just what is accomplished by this proposed amendment, and what effect it is going to produce.

The CHAIRMAN. Will you gentlemen explain?

Mr. REICHMANN. Yes; there are a number of measuring devices now on the market, and it is very easy to conceive of a great many others which could be made; therefore, of course, specifications of that kind, must take in a great many things. Where a person would use, for instance, a 2-gallon pump and wants to subdivide the first gallon into smaller divisions, such as a half-gallon or a quarter-gallon, if you please, then the amendment allows them to do that, and they must then also comply absolutely with the tolerance. But, if the manufacturer can devise a means so that the divisions are readily discernable and can be readily read, then all well and good, and he can do it. Now, if he can not make the reading so that they can be readily read, and within the tolerance, then, of course, he can not do it. But, as Dr. Stratton explained to you yesterday, whereas 10 years ago no one would have conceived, for instance, or have attempted to make, gages or something else, by using wave lengths of light, now it is an ordinary shop practice here at the bureau, and it is the shop practice in several manufacturing concerns which I know of. Even if they can come within the tolerance any other way, for the smaller subdivisions below a gallon than by this limitation, that specification says it is impossible to make a readable device unless you have 0.04 of an inch.

Mr. Ramsdell. I understand then that this applies only in the case of an instrument having graduations between zero and one-gallon mark?

Mr. Reichmann. Absolutely.

Mr. Ramsdell. If we have these graduations and can not show within the tolerance on that graduated scale, we may apply a quantity stop?

Mr. Reichmann. I think so.

Mr. Corey. In other words, this adds words without changing it?

Mr. Reichmann. Yes; only it makes it impossible to have any graduations below the gallon, because it arbitrarily assumed that the smallest readable distance is 0.04 of an inch.

Mr. Holbrook. Yes, Doctor; but it absolutely does not prohibit having graduations of less than 1 gallon on the pump; it merely requires that if quantities of less than 1 gallon are on the pump they must show the tolerance on that amount equivalent in vertical height to 0.04 of an inch.

Mr. Reichmann. That is exactly the point. Suppose you can devise a means, by means of gears or optical means or what not, so as to increase that. I can readily see how you could make an attachment like the optical attachment on certain scales. Thirty years ago if you wanted a mechanic to work to one-half thousandth of an inch very few could do it, but now everybody does it.

Mr. Holbrook. In that case if the graduations were magnified, you would have 0.04 inch on the scale equivalent to the tolerance.

Mr. Reichmann. You might and you might not.

Mr. Holbrook. I assumed it was the graduations you were speaking about.

Mr. Reichmann. Perhaps I did not express myself as well as I should. You get my point, do you not?

Mr. Ramsdell. It seems to me what you are asking for here is just exactly what Mr. Holbrook explained to us yesterday. Where we have a graduation on a quantity less than a gallon, and we can not measure within the tolerance, we have got to have a quantity stop.

Mr. Reichmann. Yes; but on this particular specification, as drawn, the whole question of sensitiveness, the arbitrary establishment of what the eye can see or what the observer can see or what the manufacturer can make, is assumed. All you want to do is to protect the public primarily. Now, then, if you can deliver this—make a deliverable quantity within the tolerance, and that presupposes you will be able to read it—that is all that is desired. Now, that is what this does.

Mr. Ramsdell. If we can not read it, we can put in a quantity stop at that point.

Mr. Reichmann. Certainly; and that assumes you can put your quantity stop accurately enough, but the other way it assumes you can not put it in accurately enough. To leave that out, to me, means that it prohibits your quantity stops below the gallon. I do not think there is any question about that from a technical standpoint. So far as expression is concerned, it clarifies it. I will stake my technical reputation on it that that is true. The way this tolerance is drawn in this particular specification, you understand, was entirely different from those that have been drawn for any other

weighing or measuring device, and the case is exactly similar to a scale, although perhaps some of the committee may not admit that. There is no other measuring or indicating device known in the realms of physics and engineering that has a straight-line function error as specified in this specification. I think it would be well if they did, but they do not.

Mr. Barnard. I feel Mr. Holbrook, as representing the committee, is willing to admit it is well enough to put language into this specification that will make it absolute and positive, if you please, instead of inferring that something might be the case, because there might be, in some particular State, a certain construction of that language that might not be in keeping with what the committee might have in mind. I think in fairness to the various pump manufacturers that the language ought to be positive and complete, and that was my object in presenting this particular amendment. We propose to comply absolutely with the tolerance as specified by the committee, and we think it is just and holy, and we think the language should be complete in that respect, so that every inspector, all over the field, will know absolutely what the committee had in mind when they promulgated that particular specification.

Mr. Holbrook. Whereas the language formerly was definite and measurable, in my opinion, the addition of this language makes it unmeasurable and makes it a question of judgment. The committee has thought that a man operating a liquid-measuring device and a purchaser buying from a liquid-measuring device will be able to tell, perhaps, by careful observation when a pointer upon a graduated scale does not come within 0.04 of an inch of exact coincidence with the line. Therefore they have said that the tolerance in the case of each graduation must be represented by 0.04 of an inch in vertical height at that graduation. Now, in relation to the gallon graduations and all quantities over a gallon, this amendment still retains that requirement, but in the case of graduations of less than 1 gallon it depends upon the judgment of the individual sealer as to whether or not a man can set a pointer within less than 0.04 of an inch of the graduation—and when I say within less than 0.04 of an inch of graduation, I mean it shall not fail of exact coincidence with graduation by more than 0.04 of an inch. That is the idea of the committee. This amendment requires if the scale is only 4.6 inches long for the first gallon and stops are not provided on graduations below the first gallon that the pointer be brought more closely to the line, be brought more nearly in exact coincidence with the line, than 0.04 of an inch. Now, if we considered merely the inspector in testing this device, that might be comparatively easy. The inspector reasonably, perhaps, under some constructions could set it within 0.01 of an inch of the line, if you please, by a very, very, careful manipulation of the device.

Now, the next step is, if a sealer takes a reading glass and finds out that the pump delivers accurately when brought in exact coincidence, a coincidence within two or one or less than one one-hundredths of an inch, then the sealer is satisfied, perhaps, provided he does not consider the delivery of the device in practice and the checking of the reading by the purchaser. Now, if the dealer, after very long and conscientious study, and by the use of a reading glass sets the

pointer in coincidence with the graduated scale to a degree finer than 0.04 of an inch—and there is no other error in the pump—of course, he may be able to deliver quantities within the tolerance. But we still have to consider that the purchaser must check the setting established by the operator of the pump within a very fine degree of accuracy, less than 0.04 of an inch—which is a little more than half of a sixteenth, a little more than a thirty-second. Now, if we sacrifice sensitiveness to too great a degree, it is going to be a fact that the sealer in testing and that the dealer in setting and the customer in checking the dealer's setting must carry reading glasses in order to determine the exact coincidence of the pointer and line.

Mr. Reichmann. Mr. Holbrook very cleverly tries to give the impression that the only way of getting fineness of reading is by means of a reading glass.

Mr. Holbrook. You could use a microscope.

Mr. Reichmann. A microscope is a form of reading glass. However, that is not true. Just from the standpoint of the consumer, and speaking as a delegate from the State of New York, I do not see why the public is not only benefited by this, but also, as Mr. Barnard says, it simply clarifies the whole situation. It is not arbitrarily left to the sealer.

Mr. Neale. The specification would seem, under all conceptions of the committee, to absolutely and forever wipe out all possible measuring lines on the lower gallon, on the first gallon zero to one.

Mr. Holbrook. I must interrupt you here——

Mr. Neale. Please wait until I am through.

Mr. Holbrook. I beg your pardon, Mr. Neale.

Mr. Neale. The proposition can, in my mind, be considered as analogous to scales that we are all familiar with, having the first pound with 16 ounces on it. Would you think of wiping out all the ounces and producing a scale with a blank pound, even though the error was there and could not be seen by the eye? I defy any man in this room, even though the error be there, to take a scale and t see exactly what appears in the ounces.

Now, if a machine may be made, regardless of any reference to any machine we have in mind, whether read by a glass or by the turning of handles or cranks, so that it will show within the tolerance, whereby a half gallon will test within its own tolerance as prescribed for measuring devices, well and good. If it does not, it would fail of test, and would not be used commercially. I can not see why a measure of that kind should be arbitrarily proscribed, on the committee's assumption that it can not be done. I dare say the committee have seen all kinds of possibilities existing in this line of measuring devices. If it can be done and can measure accurately to the half cubic inch, or to the cubic inch, or whatever the tolerance may be, I can not see why it should be forever wiped off by an arbitrary decision of our own committee.

Mr. Reichmann. I would like to hear from Mr. Ralph Smith on this very point, together with the other features of liquid-measuring pumps. I dare say there are no two men in this conference who have devoted as much time to liquid-measuring pumps as have Messrs. Neale and Smith.

Mr. SMITH. Mr. Chairman, the point that seems to me should decide this discussion is whether or not the device is capable of delivering within the tolerance. I believe that the reason the tolerance committee fixed upon the figure of 0.04 of an inch as the minimum amount that could be conveniently read was that they wanted a device to deliver within the tolerance. If some device can be so constructed that it will deliver accurately within the tolerance prescribed, at a point on the scale where the tolerance is not represented by 0.04 of an inch, but by a lesser amount, it seems to me such a device should be continued in operation.

I believe if the first paragraph of this specification distinctly required that the devices must deliver within tolerance, it would take care of the situation.

The CHAIRMAN. The committee has brought in the report, which the chairman of the committee has explained, and this amendment has been offered and seconded, and unless there is further discussion the Chair will put the question of the amendment.

(The amendment was put to a vote and was rejected.)

Mr. REICHMANN. Before announcing the decision, for the purpose of the record, as a delegate from the State of New York, I want to state, and I state this knowing that I am speaking with the authority and the sanction of Dr. Porter, the commissioner of foods and markets of the State of New York, who is always working for the interests of the public, and also Mr. White, the director of the bureau of weights and measures, who is working for the interest of the public—I want to go on record that the State of New York is not in favor of deletion of this amendment, because it is against the interest of the general public; it is contrary to good engineering practice, and it arbitrarily assumes that the present construction is the only kind that is available.

The CHAIRMAN. There is a good deal to be said on both sides, and I regret very much that the difference of opinion should arise, but, nevertheless, we can not avoid that. But remember that each year we ought to feel free to correct the errors of the year before. This is a matter which will receive your serious consideration throughout the year, and if we find that we have made a mistake we will not hesitate to correct it.

Mr. BARNARD. May I ask for information, largely, that we are to understand now that from now on there are to be no graduations below the gallon mark?

The CHAIRMAN. I do not understand it that way.

Mr. BARNARD. That is my construction of the specification, and as I understood it. That is going to be my construction in Michigan. That is what the language says, and I think we should adhere to the language, and that was my object in submitting this particular amendment, so that we could be positive. That is my construction of the proposition, and that is the construction I am going to put upon it.

Mr. HOLBROOK. Graduations are allowable below the gallon marks in all cases where the tolerance is represented by 0.04 of an inch in vertical height, or in all cases where stops are provided to limit the stroke or limit the delivery.

Mr. REICHMANN. Mr. Chairman, may I at this moment introduce a resolution—and I do that in order to protect the good name of the

Bureau of Standards, in advising the conference, in order that there may be consistency in its attitude—that the specifications for scales be also arbitrarily designated so as to wipe out all graduations on dials of scales, and on all indicating scales which do not have a tolerance in which the minimum distance of division is prescribed. I make that as a motion, that a committee be appointed by the Chair to revise the tolerances and report to the next conference, so as to have a consistency in all the specifications adopted.

Mr. Barnard. I will support that motion, Mr. President.

Mr. Ramsdell. Mr. Chairman, inasmuch as there seems to be such a difference of opinion on this subject, is not this a question that could be taken up and settled at your next conference? Let us not dispose of it now in a way that may cause embarrassment to the sealers as well as to the manufacturers.

We understood yesterday Mr. Holbrook's explanation, and it seemed to make the whole subject perfectly clear to us, but if there is any question as to the interpretation that may be placed upon this in different States you can readily see the confusion it is going to lead to and the position in which it is going to leave the manufacturers. What we want to know is what will be acceptable in 48 States and not in 46 or any number less than 48.

Mr. Frary. Mr. Chairman, the adoption of these specifications and tolerances is a matter of considerable importance to a good many of us, because, as this gentleman has just said, the operations in the States depend upon them. Now, I am not perfectly clear upon this new No. 7. I take it that it is applicable only when the graduated scale or dial is the sole means of determining the amount of liquid discharged; that if stops are provided, then this specification does not apply to the instrument. Is that correct, Mr. Holbrook?

Mr. Holbrook. At any graduation at which a stop is provided the pointer does not have to be brought into that degree of coincidence with the graduation.

Mr. Frary. Then, in the illustration given in the last sentence of the specification, we have an example, first, "if 1 gallon is the first graduation; (2) there is no stop, overflow pipe, or other automatic means of terminating the delivery," and so on. Now, suppose the first graduation is not 1 gallon but one-half gallon, then this would not apply, would it?

Mr. Holbrook. Without a stop at the half gallon?

Mr. Frary. Whether there is or not, it does not say.

Mr. Holbrook. You only need 0.04 of an inch at the first graduation for which a stop is not provided. I explained with scales on the board here the other day that 4.6 inches per measured gallon was not required if there was a stop at the first gallon and no graduation below the first gallon. If there is a stop at the quarter gallon and half gallon and gallon, and no graduation below the quart, then this length of scale is not necessary. Such a length of scale is necessary so that 0.04 of an inch in vertical height will represent the tolerance at those graduations at which stops are not provided. If the first graduation on the pump, for instance, at which a stop is not provided is 3 gallons, then the length on the scale or dial equivalent to the measured gallon, when the graduations are equal, only needs to be one-third of 4.6 linear inches.

Mr. Reichmann. Under that proposition, the way it stands, unless clarified in the way that has been suggested and which was voted down, it assumes that the customary laws are primarily for the benefit of the public on the basis of the old English law that devices should not be manufactured which are likely to facilitate the perpetration of fraud. This assumes a stop which the customer can see—but a stop can be put in there wherever you want to, according to that interpretation, which I do not think is correct, the way I read it, if I can read the English language—but if he has something that he can see he can put the stop wherever he wants to. If he has a stop which you can not see, then he can not put it in and let the public know what it is getting.

I think without that insertion, unless you wish to put on a blind stop, so the public can not see what it is getting——

Mr. Holbrook. The specifications require, when stops are provided, the amount corresponding to each individual stop must be plainly indicated on the pump.

Mr. Reichmann. Is not the whole object of all these specifications the point Mr. Neale so ably put, that if you deliver the quantity within the tolerance—I do not care whether it is a weight or a gasoline measure, or a molasses measure, or what not—that if it comes within the tolerance, that is all you want for the protection of the public. That sounds to me like sound economics.

The Chairman. There is, however, I believe, this other question as to the practicability of reading. Several times you have referred to the question of a scale; whether we should leave off the first divisions of a scale. Certainly no scale which has a total capacity of 100 pounds should have its first division divided into ounces, unless those first divisions, reading ounces, give you ounces within the tolerance. It seems to me that is clearly what Mr. Holbrook has in mind. They are both right to a certain extent. The statement of Mr. Reichmann is entirely right. Mr. Holbrook claims that these devices should clearly indicate that that is the fact, so that the man who buys can clearly read the fact. Is not that right, Mr. Holbrook?

Mr. Holbrook. Yes.

The Chairman. I have not called for a vote on this new No. 7. You have voted down the amendment, and my suggestion is that we put the new No. 7 as the committee has it to a vote, and if you do not agree with that, vote it down.

Another proposition is to defer this until later. I am sure if you get together and get to talking this over, you will agree upon something.

A Delegate. I do not quite see why this little controversy should occur on the floor of the conference. As I understand it, this committee was appointed and is fairly representative. They have consulted with the manufacturers, and they have accepted suggestions, and I really do not see why this matter should come up in such form this morning. I am sure that we should all leave here in perfect harmony and that there should be nothing but harmony. Now, I believe that this little controversy can be straightened out if these delegates who seem to have a grievance have a further conference with the committee, and we can act upon this matter a

little later on. I make the motion that this matter be taken up as a special order of business to-morrow afternoon, if it can be done, and that action be deferred at this time.

(This motion was seconded.)

The CHAIRMAN. In reference to that the last speaker has raised a question as to why this should be considered on the floor. There is an important point which has an educational value. You hear these discussions on the floor, and when you come to interpret these rules you will know what is meant by those points.

Mr. BARNARD. Speaking to the matter which the gentleman preceding me has mentioned, I do not want any delegates here to infer the thought or idea that I have any grievance with the specifications and tolerances committee, because that is not true. I have the greatest confidence in the world in the judgment of Mr. Holbrook and the other members of the committee. However, it is simply a difference of opinion as to the phraseology and the language of that particular specification. Mr. Holbrook's idea is that certain language should be used, which we think is not positive enough. So far as the specification itself is concerned, we are in hearty accord with a great deal of what Mr. Holbrook says, but we believe it should be positively stated, so there will be no opportunity for misunderstanding so far as misinterpretation is concerned. I simply mention this to correct any erroneous idea that I have any difference or grievance, so far as that is concerned, with Mr. Holbrook, because I have not.

The CHAIRMAN. I think we all feel the same way. There are bound to be differences of opinion. This discussion has been very useful to me, and I am sure it must have been to others.

Mr. REICHMANN. This is not a personal matter; it is simply a question of whether we want to arbitrarily put something in a specification which will have to be upset again in the very near future. When these scale specifications came up that same thing was brought up, and it was decided by the conference several years ago, on the broad principle that if you had a scale, a computing scale, for instance, that weighed up to 30 pounds, you established the tolerance for the large graduations and the small graduations; then, God bless the manufacturers, if they can live up to this tolerance, let them make it. If they can not provide ways and means for doing it, all well and good. As a matter of fact, if you tested to an ounce or half an ounce on the ordinary computing scale they would not come up to tolerance. Is the public defrauded? I doubt it; I know they are not. As a matter of fact, it makes a better looking instrument, the kind of looking instrument that the commercial people of this country want.

Mr. NEALE. I have known my friend Mr. Holbrook longer than I have most of the people in this room, and you could not hurt that big fellow's feelings if you wanted to, because he has a hide like the Pachydermata. Our troubles this morning do not appear serious to the older members of this organization, and the newer members ought to know that this is the place to fight out our quarrels. I have enjoyed the privilege of being on committees, and have worked hard, and they have worked hard to produce certain children of their brain that they could not throw out of doors. But I would personally feel hurt if we left this conference this morning, being one of many

which I have had the privilege of attending, with something hazy or with a feeling that there was not a unanimous consent about something we all thoroughly felt was right, so I will say again, so far as the committee is concerned—two of them I have known longer than any other people in this room—I could not take any personal stand in the matter.

The CHAIRMAN. There will not be any bloodshed over this matter, but the time has come for luncheon, and there are two or three more items that must be considered, so we will make this the order of the next meeting. I hope the committee will get together with those who are interested in this matter, and I feel quite sure you can come to some agreement. I am not at all worried about that. I have been asked to adjourn the meeting for this afternoon, and I think it a very good plan.

Mr. RAMSDELL. There is No. 18 on here, that the manufacturers are very much interested in, Mr. Chairman.

The CHAIRMAN. On account of somebody going away, do you wish to consider the balance now?

Mr. RAMSDELL. Yes.

The CHAIRMAN. I am perfectly willing to do so.

Mr. JOHNSON. I want to impress upon the members of the conference that your committee on specifications and tolerances is not arbitrary in any matter in which it is concerned. It has on every occasion invited any member who is interested in the specifications to confer with them in their deliberations, and we have spent very nearly every evening and the entire Sunday forenoon deliberating on these matters. We only have the best interests of the conference at heart, and I want to assure you, if there is any prejudice in your mind that we are arbitrary, that is absolutely not the fact. We are open-minded in these matters, and we want to arrive at the conclusions which are absolutely right, or as nearly so as possible.

Mr. HOLBROOK. The tolerance committee will get together between 6 and 8 o'clock this evening, at room 507, in the Raleigh Hotel, and anybody who wishes to be present and to present anything to the committee may do so at that time.

(A motion to adjourn being made and seconded, it was put to a vote and was carried.)

(Thereupon the conference adjourned to meet at 9.30 a. m., Thursday, May 27, 1920.)

SIXTH SESSION (MORNING OF THURSDAY, MAY 27, 1920).

The conference reassembled at 10 o'clock a. m. at the Bureau of Standards, Dr. S. W. Stratton, chairman, presiding.

DISCUSSION OF QUESTIONS CONCERNING THE PRACTICAL SIDE OF WORK.

The CHAIRMAN. The meeting will please come to order.

Gentlemen, owing to the adjournment yesterday afternoon we overlooked, or rather postponed, several important discussions that were on the program. I am going to take up that discussion this morning, devoting 10 or 15 minutes to each one of these three subjects devoted to the practical side of affairs with which we are all concerned—"The practical side of weights and measures work, including methods of inspection for the detection of fraud"; "The standardization by Congress of units of weights and measures and its relation to commerce"; and "Sales of dry commodities by the hundredweight versus sales by measure."

Now, I would like very much to see this discussion confined, as far as possible, to the city and county sealers—those people who come directly in contact with field work. I think here is a very good opportunity for the delegates other than State delegates to say what they have to say, because they are directly concerned with these things. The first subject is the practical side of weights and measures work. I assume that will cover practical experiences—things that you have found out, suggestions as to the correction of evils, and so on. I have no particular individuals in mind to call upon, but, as I have said, I would like to hear from some of the local sealers.

Mr. GOODWIN. I rise, just to start the subject and get it going, to give them a little experience of mine—a little talk on my experience in inspecting in my State. I will take a case arising in the city of Providence. A year ago we adopted a system there by which nearly all goods were required to be sold by weight instead of by measure, reserving, however, the right to the farmers to use the bushel and the equivalent of the bushel, because we could not get the law through without conceding that idea. I have taken great pains to investigate these new conditions arising from the sale of products by weight, and it is working out very satisfactorily in our cities, and, in fact, in all of the large towns of the State. It is of vast importance to the merchant as well as to the purchasing public, and we are very much gratified over it, and we think that we have made a move in the right direction. As you called on some of the sealers—the practical men who have to do the practical work—I hope some of the delegates here from the cities and towns of the different States will give us talks on their experience. It is worth more than the talks of all of us who do not do the practical work.

Mr. HILL. My experience in this regard is somewhat peculiar. Probably my superior officers—the mayor and the commissioners—have given me more latitude than some of the rest of you have. I say to you that I have had considerable experience that would surprise you. Living in the town, as I have, for 20 years, I have known men that have been in business and thought that they were absolutely honest, but after getting into this office—which had been neglected in our town—I find some of these men there whom we thought were absolutely honest so crooked that they can't lay straight in bed. I read the law of the city and the State and the United States laws, and also got laws from some of the other States, and I got our law down to a point where I thought I understood it. We have a pretty good State law there now, and whenever I catch a man violating that law I notify him and tell him not to tell his troubles to me but to tell them to the court. I made that go, and I am going to make it go. I do not care if he is the biggest man in our town, if I catch him violating these laws, I will prosecute him as quick as I will anyone else. I have no pets; I am not running for any office and am not going to run for any office. The press is with me in this, and whenever I bring a prosecution against a man it has its effect. I say to you that where I had 25 complaints six months ago now I do not have 3. During my stay in office I have filed 96 complaints, I believe, and got 39 convictions; and I say to the sealer, to the weights and measures inspector, "Take hold of this strong!" Don't make a mockery of it; don't tell a man he is violating the law unless you mean to carry it through. If you do otherwise, you lose your prestige, because the next time you tell him he will pay no more attention to it than if you had not spoken to him. I want to say to you in this connection that this work that is being done in Dallas, Tex., is being done by myself; I have no assistants.

I am somewhat surprised to be here. If it had not been for the director of this institution and other people writing to our mayor, I would not have been here; but I say to you that if other people will take an interest, that is what gets the results. We have a live bunch in our city offices.

If you will bear with me, I will give you a synopsis of the work that I have done in the last 12 months. I have inspected 1,703 gasoline pumps during a year and ordered adjusted 181, condemned 19. Scales, inspected, 3,819; ordered adjusted, 217; condemned, 61. Weights, tested and inspected, 2,694; condemned and confiscated, 117. Dry measures, inspected, 176; condemned, 9. Liquid measures, inspected, 217; condemned, 19. I weighed 898 loaves of bread after the bread law went into effect. I have weighed 317 pounds of butter since we have had a law on butter. We had more trouble with our fuel than with any other thing this last winter. The trouble is that our wood is cut only about 3 feet 4 inches long. One man came to me and said, "What are you going to do about this law?" and I said, "You are going to deliver 128 cubic feet for a cord." He said, "We did not buy it that way." I said, "I can't help it. Whenever you sell a cord of wood and fail to deliver that 128 cubic feet, you go to court." He said, "I can't afford that." I brought it to the attention of the mayor, and I said, "The wood is all cut short; they will sell it by the load or stick, and they will not sell it by the cord, but if I can

succeed in getting them to sell it by the cord I will bring them to time." I weighed 223 tons of coal and I found a great deal of it short. They will say, "We started with so much," and I will say, "I don't know what you started with"; then I go to the other end of the line and weigh it. I got good results on coal. These people want to get me out, but I say to you that before they get me out they will have to get a new set of officials. I have the present mayor with me, and they must get a new mayor if they want to get me out.

There is too much crookedness in the use of weights and measures. As I say, I filed 96 suits and got 39 convictions. I brought them out and got them into court and got them in the papers, and it had its desired effect, and if you can get the desired effect by bringing suits you have accomplished something, whether they pay a fine or not. In the 12 years preceding the time that I came in and took hold of it only three suits were filed. They are getting wakened up to the laws, and you people who would have good results should write to our mayor and insist on the evidence. It will not be long until we will not be fourth, fifth, or sixth in weights and measures, but we will be second to none.

The CHAIRMAN. I would like to get around to a number of others, so I would suggest that you submit the statistics in your statement. We would be very glad to have those on record.

Mr. HILL. I have a complete report at home. I would like very well to have it go on record, and I will send it to you if you will have it inserted in the record.

The CHAIRMAN. All right.

Mr. STEWART. I would like to suggest that everyone who is going to speak on a question read the topic, which is, the practical side of weights and measures work. Included in this is inspection and what is detection of fraud. Talk on this or keep your seat.

Mr. FULLER. I would like to mention something we have found of great benefit in inspecting canned goods. We have gone to the canning companies and they have given us cans of all different sizes to use as average weights, so that we would not have to cut open the cans to get tare weights.

We obtained a conviction against one of the largest companies on butter, which averaged one-fourth of 1 ounce short per pound. They had been warned before, and I believe that continued warnings lead to contempt for the department. After they have been warned, but continue these practices, you have to take them into court. The attorney for that company wanted to impress the judge with the size of the company, so he said, "Why, your honor, this company cuts 12,000 pounds of butter daily." The judge figured 12,000 pounds a day and one-fourth of 1 ounce short on each pound and imposed a fine of $500, which they paid. During the last year we brought 144 prosecutions in Los Angeles and obtained 137 convictions. I do not believe in trying to make any record on prosecutions, but I do believe that you have to bring prosecutions and get convictions to obtain respect for the department and compliance with the rulings.

Mr. BOYE. In my mind we have a proposition here that should be discussed thoroughly. Yesterday with considerable interest I heard Mr. Neale read a paper on the weight of bread, and that particular thing interested me for the reason that I represent a city and am

sealer of that city, and I have had some experiences during my two years in office, particularly on bread. We, very unfortunately, in the State of Maine, have not what is called the "Net-bread law," and it pleased me when Mr. Fuller, from California, explained to the convention the splendid law that they have. I will say that in my city we have a number of foreign bakers, such as Italian, French, and Jewish bakers. Of course, it is not my intention to criticize them because they are foreigners, but they handle bread in a very poor way. I have noticed that the French bakers and Italian bakers pile bread in barrels and the loaves are handled by different people; and in one place I noticed that the fishermen went to the barrel and helped themselves.

Mr. Stewart. Mr. Chairman, I must insist that we stick to the subject in hand.

Mr. Bove. I most respectfully request that the committee will draw up a law in regard to bread that will be uniform in every State of the Union. It is a very important matter.

The Chairman. The committee has that in charge and, I think, will suggest a law. Now, the time has passed for the first subject. I really intended to bring out new methods for the detection of particular frauds that you come across, in order that the others may benefit by them.

DISCUSSION OF SPECIFICATIONS AND TOLERANCES FOR LIQUID-MEASURING DEVICES (Continued).[9]

Mr. Johnson. The committee on specifications and tolerances are now ready to wind up the subject matter that was referred over from yesterday's program.

The Chairman. Is it the wish of the convention that we return to that order of business? If so, we will proceed. I want to say in starting out that we have already spent too much time on that, and we must not get into the habit of expecting that everybody must have his own way. In regard to this specification No. 7, the committee came in with what seemed to be a carefully thought out and prepared report. Another side to this has appeared, and that is the reason for bringing it up, in order that we should have a very free and open discussion. A decisive vote was taken on this point yesterday, but there seems to be still considerable misunderstanding as to what it really means. I have been surprised in talking with the members to find out how many did not understand it. Now, we can not afford to get into anything like a violent controversy over a matter of that sort—we have had too many of them in the past. There are two or three ways open to us. One would be to postpone—to do as we often do in the preparation of codes, etc. The bureau has a large number of codes and regulations under its supervision, and in a case of that kind it is customary to write a regulation or a code "Tentative" when we wish to try it out. Sometimes whole codes are put out as "Tentative." Now, in starting out with this I am going to ask the chairman of the committee, Mr. Holbrook, to make a statement in regard to it.

Mr. Holbrook. I do not understand just what kind of a statement is desired. The committee this morning has come to the conclusion—

[9] For text of specifications and tolerances as finally adopted, see appendix of this report.

and I believe Mr. Johnson can explain the conclusion better than I can—but it was to the effect that if this specification was going to cause a storm of conflict in the conference, the specification as written by the committee might be adopted tentatively to be reviewed next year.

Mr. GOODWIN. I hope there will be no transfer of this matter to another session. I think the time has arrived when we ought to enact this proposition for good and all time. I have been coming here a number of years, and I have heard this subject discussed on several occasions, and I——

The CHAIRMAN. Not this particular point.

Mr. GOODWIN (continuing). And I earnestly hope that the specifications—the report of the committee—will be adopted now as a whole, and not carried over to another session.

Mr. JOHNSON. I believe that the delegates may have reached the conclusion that it means the referring or the placing of the entire specifications in the "tentative" class, but such is not the case; it is only one particular specification, No. 7, which is a new one. We will put it that way. It has to do with a new order of construction in a sense which may not be entirely either clear or feasible, and inasmuch as it is a new one and inasmuch as those that we have formerly adopted have been tentative for a year, it seems almost to have been the policy of the conference in the adoption or in the considering of new specifications to make them tentative for a year so as to see whether they are practicable and applicable, and with that thought in mind I beg at this time to move that specification No. 7 be adopted tentatively at this conference.

Mr. HOLBROOK. Mr. Johnson, so far as I have been able to follow this discussion, there has no one ever taken the floor to disagree with the first paragraph of specification No. 7. In fact, the majority of people who have spoken have said that the first paragraph of specification No. 7 was very necessary and was entirely satisfactory. So that, with your consent, I would suggest—and we could listen, then, to any criticisms—that the second paragraph of new No. 7 be made tentative for a year.

Mr. JOHNSON. I will accept that as an amendment.

Mr. NEALE. Mr. Holbrook, do you mean the first paragraph down to the word "provided"? It would not mean anything if you stopped there.

Mr. HOLBROOK. I do not get your point.

Mr. NEALE. Which part do you include?

Mr. HOLBROOK. There are two paragraphs, are there not? We suggest that the first paragraph be adopted and the second paragraph be made tentative.

The CHAIRMAN. The discussion is with reference to the second paragraph only.

Mr. HOLBROOK. We suggest that this be made tentative, beginning at the point "this specification shall be construed to require."

Mr. NEALE. Dr. Stratton has said that we are wasting too much time; we have been working hard. I will say to the delegates that we have full faith in our tolerance committee, but when there comes a disagreement in the Supreme Court it makes the fur fly, and when in our minor institutions eminent scientists and physicists can not agree it is well that we sit back and hope they can come to some

agreement. I strongly urge, as one of the older members of this conference, that this be made tentative for a whole year, and, believe me, they have given us a lot of things in the rest of the document to keep us busy for a year. If this stole some of the benefits that we would derive from their labors, I would be reluctant to agree, but we have got our tolerance, and more than we can possibly attend to without delving into something which we can not see. There are worthy arguments on both sides.

Mr. Holbrook. Another suggestion has just been made by a delegate further to limit that tentative proposition, and I believe the suggestion is a very good one. The delegate suggests that the storm center of all the discussion thus far has been around the graduations for values which are less than 1 gallon, and, as far as I remember, every man who has spoken to the specification has spoken only in regard to such graduations as are less than 1 gallon. He suggests that the motion be amended to say that this specification is tentative only as to the values below 1 gallon.

Mr. Reichmann. While I recognize the technical maneuvering resorted to, I think that last suggestion would practically do the very thing that those opposed to the second paragraph of the specification are opposed to, and as a delegate from the State of New York I again want to emphasize the statement I made yesterday: It is simply against the public benefit, and I believe Mr. Johnson's motion to do away with simply the second paragraph will solve the problem. It seems hard for me to conceive, having known Mr. Holbrook since he was a youngster, that he is using the kaiseristic methods, which he possibly is.

Mr. Holbrook. I object to the personalities.

The Chairman. Just pay no attention to it.

Mr. Holbrook. I want the record to show my objection.

Mr. Reichmann. I want to rise to second Mr. Johnson's motion.

The Chairman. The committee has made what I think is a very reasonable and proper motion in this case; that is, that the disputed part of this paragraph be made tentative and be held up for the coming year. Let us take a vote on that proposition.

Mr. Barnard. As to that tentative proposition, if that matter was to be construed in my judgment by the delegates who are here, who understand that that portion of that paragraph is to be strictly tentative, it would be so construed, but I wish to submit to you that these specifications are going out all over the United States, and in the four corners of the various States there are sealers who never will attend this conference, who will never have an opportunity to understand what the committee has in the back of their minds, and who are going to take this specification literally, just as it is written, and I wish to submit to you that you are going to have no end of trouble in the various States. Now, time after time—I could mention them if I saw fit—sealers from different sections of Michigan have written me, and come to my office, and asked for advice on certain specifications; they came to me because they knew I had been to the national conference and ought to know, if I did not know, something about it, and the construction that they placed on those specifications might at the time have surprised you. Now, I want to submit to this conference that if the latter portion of that No. 7 is allowed to remain,

though it is understood amongst us here that it is to be tentative, you will find officials in the various sections of this country that will not consider it so and will take it as it is written, literally, and will attempt to enforce it, and you are going to have difficulty. Pump manufacturers are going to have difficulty. I can not see the advisability of it. I will admit that I may be wrong, but that is my opinion, and I, as a citizen of this country, have got the right to express my opinion, and that is my opinion on this proposition; that if this second section of specification No. 7 goes out as it is written here, even though it is understood amongst us that it is tentative, we are going to have trouble, and I believe as long as we are here to-day that this matter ought to be settled once and for all. Why is it necessary, gentlemen, when you bump up against a little trouble, to say, "Well, let us back away from it"? I believe in going ahead and settling the proposition right now. That is what we are here for. We all know what we have got in our minds; we all know that the specifications committee has worked for weeks on this proposition, and they have admitted, if you please, from the rostrum, that they have no objection to the proposition, only they do not want it in writing. I believe that we should go ahead and settle this matter right now one way or the other. We have studied on it for a year.

The CHAIRMAN. Are you a member of the committee?

Mr. BARNARD. I am not; but I knew this proposition was coming up.

The CHAIRMAN. I think you are overlooking one point. If this goes out, if we adopt this tentative arrangement, that must be so stated; there must be a paragraph printed after this specification that states it is tentative only. However, I want you to be satisfied about this. There are a number who believe we should finish this and settle it up. But if there is any doubt about the matter, if there is any reasonable division in regard to the thing, it would be bad policy to force it through, and there is nothing wrong particularly in letting it go over.

Mr. BARNARD. I would rather see the whole specification retarded for one year in preference to seeing it go out half shot.

Mr. JOHNSON. Just to clarify the mind of my friend from Michigan, when we return to our jurisdictions we are supposed to be sufficiently informed and experienced to understand just what the procedure was and what the intentions of the conference are, in scientific terms, if necessary. What I will do when I get home will be to take each specification and make a draft of it, make a survey of it in plain words, so that the men in the field who are not here will understand just what the conference has done. My men all understand what the word "tentative" means, and if they do not I am going to explain it to them, so there will be no confusion as to their instructions or their interpretation of the intention of the conference with reference to this particular specification.

Mr. HOLBROOK. For the sake of the record, once again, I want to insert in the record the fact that I do not agree with Mr. Barnard as to the admissions made by the committee in reference to this specication.

Mr. FRARY. The suggestion is to make this specification tentative?

The CHAIRMAN. It is not the specification, but the second paragraph of it.

Mr. FRARY. The suggestion to make the second part of it tentative is not at all new in matters of this kind. I am new in the weights and measures work, but I have had some experience in food and drugs matters, and it is the practice, and has been for years, for instance, in the Association of Official Agricultural Chemists, which association prescribes the methods to be used by all chemists in the determination of quantities or actions brought under the laws of all States, as well as the Federal bureaus, to adopt methods provisionally or tentatively. The words "provisionally" and "tentatively are used synonymously. It is the regular practice, rather than the exception, when a new method is suggested or a new specification is brought up to adopt that method or specification as tentative or provisional for one year, and during that time it is tried out, and then it is brought up the following year for final action—perhaps the final action may be put over longer than one year. The same thing is done in connection with the work of the committee on definitions and standards. It is a joint committee, made up of members of the Department of Agriculture, Association of American Dairy, Food, and Drug Officials, and the Association of Official Agricultural Chemists. So this is no innovation to adopt a specification or a part of a specification tentatively or provisionally.

Really, however, it seems that this whole specification, No. 7, should be adopted tentatively, rather than to make official the first paragraph and leave the second paragraph tentative. I believe the two are closely bound together. If not, why should they be put in the same subdivision of No. 7? I think that they are interdependent; that, therefore, if we are to make one paragraph tentative, we should make both paragraphs tentative. No harm can come from such action. The specifications which are adopted officially should be marked "Official," and those which are adopted tentatively should be marked "Tentative," and then there should be no cause for misunderstanding.

Mr. RAMSDELL. The pump manufacturers, I think, are very anxious to see harmonious action on this specification, as well as all others, and we feel that all the consideration that is required should be given the subject with that end in view. We are a little anxious to know, however, that if this is adopted tentatively, what position it is going to leave us in for the rest of this year. Will the sealers accept such graduations, stops, and overflow pipes as have been recognized in the past until your conference finally and definitely passes upon this point. I think that we would like an expression from the delegates on that point, so we may know where we stand, and will not be running into trouble in the 48 States of the Union. I am not asking for action at this time. I feel that all the consideration that is necessary should be given to the subject in order to bring about harmonious action. We want the same ruling in 48 States; we are particularly concerned about that.

The CHAIRMAN. I understand that tentative adoption always means that that will be enforced for the year but with a view to revision at the end of the year. That is the usual interpretation.

Mr. IRVINE. It seems to me no harm can come from adopting this specification as you have suggested here. I do not believe that any man who is in the practical line of weights and measures work will be so unreasonable that he would overlook a suggestion that comes from this department—in other words, from the fountainhead of weights and measures. I think many of the delegates overlook the fact that the practical men who are doing the weights and measures work are a reasonable set of men trying to do their honest duty and to live up to the requirements and also follow instructions that come from the fountainhead, and I do not believe there can be any harm in adopting these specifications tentatively.

Dr. Stratton has informed the delegates and members present here that a paragraph will be added in plain English that the specification is only tentative. I am very much in favor of adopting it tentatively, as the committee suggests.

The CHAIRMAN. I would like to know whether the committee will accept the proposition to make the whole paragraph tentative.

Mr. REICHMANN. Will you please define again what you mean by "tentative"? As I understood you, you said a tentative specification is one that is in force until it is overruled. If that is the definition, then you had just as well adopt the specification.

The CHAIRMAN. I am willing to adopt any ruling in regard to that. I presume "tentative" means "set forth," "suggested."

Mr. REICHMANN. It is not in force?

The CHAIRMAN. It is to be tried out.

Mr. REICHMANN. It is not in force until it is acted upon?

The CHAIRMAN. That is up to the State official.

Mr. FISCHER. There is nothing new in the adoption of tentative specifications by this association. When the specifications regulating ordinary weights and measures were adopted at first, they were adopted tentatively. They were in use for a year before they were finally adopted or made official, and during that time my recollection of the matter is they were in force but were not enforced with the rigor with which they were enforced when they were finally made official and finally adopted. Is that not your recollection of the matter, Mr. Holbrook?

Mr. HOLBROOK. I think you are right.

Mr. FISCHER. I think Dr. Reichmann can corroborate that statement.

The CHAIRMAN. The former speaker, Mr. Frary, said that the word "provisional" is very often used. There is not any question that it is within the rights of any official to accept or not accept tentative or provisional specifications. Is that not right, Mr. Johnson?

Mr. JOHNSON. Hardly, as I understand it. My interpretation would be to the effect that the word "tentative" would be construed to mean not mandatory, with the purpose in mind of trying it out to determine the advisability of it. It does not, from my point of view, mean that the specifications are applicable in the same sense that those that have been adopted are.

I will say there is a personal option on the part of the manufacturer as well as of the State to adopt a specification until such time as the conference makes a definite and final approval of the specification. Have I the committee's views on that? Am I right from your point of view, Mr. Cluett?

Mr. CLUETT. You are.

The CHAIRMAN. That is exactly as I tried to state it.

Mr. JOHNSON. I believe we only have a few more hours left and we do not want this thing to continue up to the closing period. We have a number of other matters of equal importance before the conference, and I call for the question. [Cries of "Question."]

Mr. BARNARD. I want to say in connection with Mr. Johnson's definition of the word "tentative," that if that is the way it is defined, I agree with it.

The CHAIRMAN. The question is on the second paragraph properly explained and marked "tentative" or "provisional."

(The motion was put to a vote and was agreed to.)

Mr. STEWART. There is another point in this specification that I have not heard anything said about, and in reading over it, it seems to me it has been cut out. It is a very important one.

The CHAIRMAN. In this specification?

Mr. STEWART. Yes, sir; and that is section 13, as we had it in the tentative specifications.

The CHAIRMAN. We are going to finish this up, and we will reach No. 13 in a few moments.

Mr. STEWART. That will be satisfactory.

The CHAIRMAN. I think there are but two or three left. No. 13 may be the next one.

Mr. HOLBROOK. The next specification which the committee desires to present is an amendment to specification No. 18. Specification No. 18, in its original form, read as follows:

Only one shut-off cock permitted in discharge line.—No more than one shut-off valve or cock intended to be operated by hand for the purpose of cutting off the flow of liquid shall be permitted in the discharge line of a liquid-measuring pump, and in the case of liquid-measuring pumps with which hose or other movable delivery tube is used, or which require the use of a vacuum-breaking valve, or equivalent device, any shut-off valve shall be located as near as possible to the pump itself and not in the hose line or at the extremity of the hose.

It is noted, let me state, in the report issued a day or two ago, that the committee has not as yet completed the consideration of this specification. It has since been completed, and mimeographed copies of these were run off and distributed to the delegates at the conference. This new wording of old specification No. 18 reads as follows:

Only one shut-off valve or cock which can be operated by hand for the purpose of cutting off the flow of liquid shall be permitted in the discharge line of a liquid-measuring device. A second shut-off valve or cock may be provided in the case of a liquid-measuring device equipped with a hose and designed and constructed so that it must be operated with the hose full of liquid at all times, but such second valve or cock shall be so designed and constructed that it can only be closed off by the use of some tool or device which is outside of and entirely separate from the measuring device itself, such as a wrench, screw driver, etc., but not an adjusting pin.

This specification is not to be construed as allowing two shut-off valves or cocks in the case of devices in which the hose or any part thereof can be drained of liquid after the actual mechanical operation of the mechanism of the liquid-measuring device is discontinued, in any way except as follows: (1) By means of the mechanically operated valve; (2) by delivering from the measuring device more than the full measuring capacity thereof during the actual mechanical operation of the mechanism thereof.

When under the terms of this specification only one shut-off valve or cock is allowable, this shall be located as near as possible to the measuring device itself, and not in the hose line or at the extremity of the hose.

The CHAIRMAN. You have heard the substitute. Are any explanations requested?

Mr. REICHMANN. I would like to ask if the gentlemen who represent the manufacturers agree to that?

Mr. RAMSDELL. We have a condition to contend with here in Washington and Philadelphia and some other cities that causes us more or less embarrassment. We are obliged to place the pumps on the inside line of the sidewalk or back on private property, and pipe under the sidewalk or have a swinging arm over the sidewalk to the curb, where delivery may be made. The usual method here in Washington, and I think in Philadelphia, is to put the pipe under the sidewalk to a pocket at the curb, and there we may put on our hose and coil it up and leave it on the sidewalk. We have to have a faucet or cock at the end in order to keep the line or the hose full. We do not like that arrangement, but we had to submit to it because of that ruling of the authorities. We would like your assistance in having that pump placed where it belongs, not only in your interest, but also in the interest of the insurance people. Until we get that feature, we feel we have to have a cock at that end and one at the pump, and we would like to see some proviso introduced that would enable us to make such installation in Washington and other places until such time as these laws are repealed. In the interest of safety and in the interest of good measurement, the pump ought to be placed where it is designed to be placed, but as I have already said, we have to place them back sometimes on the inside line of the sidewalk or on private property.

The CHAIRMAN. Is it not true, if you take a hypothetical case, if we adopt the specification here, and you found in some city an ordinance that is contrary to that, that you would have to obey the ordinance; but that the adoption of this specification would help you bring about the change of the ordinance?

Mr. HOLBROOK. May I ask you a question, Mr. Ramsdell? I take it you are in favor of this specification except in circumstances where laws or ordinances or regulations of the fire marshal exist, making its application unenforceable?

Mr. RAMSDELL. Yes.

Mr. HOLBROOK. Let me say, Mr. Ramsdell, that the next item will be a point which covers what you have in mind.

The CHAIRMAN. You have heard the new number as read. If there is no objection, we will consider it as adopted.

Mr. L. F. JOHNSON (representing S. F. Bowser & Co.). I would like to ask what is meant by "adjusting pin"?

Mr. HOLBROOK. That specification is taken directly from the scale specifications where mechanical means are required. It is felt that if a hole be drilled through a valve and a pin be put in to turn it, a pin in the nature of a nail or smooth pin, or what not, that the constant temptation will exist simply to thrust a pin in that and leave it at all times, and make it a manually operated valve.

Mr. L. F. JOHNSON. I understand that is in the shape of a shut-off cock?

Mr. HOLBROOK. Yes.

Mr. L. F. JOHNSON. I understand by that specification we can use a hose, and if we were to use what we call a can-filling nozzle, we can

put one of these shut-off cocks on there with a loose handle, and use that can-filling nozzle?

Mr. Holbrook. Provided there is no diversion of the measured liquid, yes; because in that particular line there will be only one manually operated shut-off cock—that is the way I interpret your question.

The Chairman. Will you take up the next one, Mr. Holbrook?

Mr. Holbrook. The proviso which I have just mentioned is in the nature of a general note to be included immediately after the specifications and tolerances, and is to be headed:

Conflict of laws and regulations.—In the above specifications certain items appear which may conflict in certain jurisdictions with present State or local laws or ordinances or regulations of the State or local fire marshals or boards of safety. In such cases of conflict an attempt should be made by the weights and measures officials to harmonize the two codes, and, in the meanwhile, it may be found necessary to suspend the enforcement of such specifications.

Mr. Reichmann. While I presume that the manufacturers agree to that, therefore it will be agreeable; yet, at the same time, I distinctly believe that should not be a part of the specifications. If anything, it should be a tentative part of the specifications, as I understand the word "tentative," as defined by Mr. Johnson, but should it not be in the form of a resolution, because necessarily the wording is in conflict with the other laws. Why should not that be in the nature of a note at the end of the hose specification.

Mr. Holbrook. This which I have just read?

Mr. Reichmann. Yes.

Mr. Holbrook. This thing which I just read was thus explained—that it was to follow the specifications and tolerances and be a note in reference to the application of the entire code, under the heading of "Conflict of laws and regulations." This paragraph I have just read is to come at the end of all the specifications. This not only refers to the cut-off at the end of the hose, but also refers to the specification in regard to the standpipe.

Mr. Barnard. Read that again, Mr. Holbrook.

Mr. Holbrook. The note?

Mr. Barnard. Yes.

Mr. Holbrook. The note which is to come at the end of the tolerances and specifications, and which refers to certain specifications which can not be enforced in certain jurisdictions, reads as follows:

(Mr. Holbrook reread the proposed note.)

Mr. Reichmann. I move its adoption.

Mr. Barnard. I support the motion, Mr. Chairman.

The Chairman. I hear no objection to it, and it will stand adopted. Going back to the preceding one, new No. 18, one or two delegates have asked for copies.

Mr. Barnard. I move the adoption of that one.

Mr. Reichmann. I second the motion.

(The motion was put to a vote and was agreed to.)

The Chairman. You will proceed with the next one.

Mr. Holbrook. The next specification recommended by the committee is as yet unnumbered and is to be included in its proper and reasonable place. It reads as follows:

All liquid-measuring devices in which the accuracy of the readings of any indicating mechanism is affected by parallax shall be so designed and constructed as to reduce the errors due to this cause to a minimum.

The CHAIRMAN. You have heard this suggestion. [After a pause.] If there is no objection, it will stand approved.

Mr. BARNARD. Mr. Chairman, I think I am a little dull this morning. I did not get that at all. Will you read it again?

The CHAIRMAN. I would suggest that you take a seat over here in front.

(Mr Holbrook reread the specification.)

Mr. CUMMINGS. I would like to inquire whether that means in the case of a graduated scale that it should be as near as possible on a level with the eye of the reader?

Mr. HOLBROOK. As near as practicable.

The CHAIRMAN. Yes; if there is any difference between the two.

Mr. HOLBROOK. The next and last item is specification No.——What was the one you asked about, Mr. Stewart?

Mr. STEWART. No. 13 is the one I have got here. That is the one I am interested in.

Mr. HOLBROOK. Original specification No. 13 read as follows:

Exhaustion of liquid supply.—All measuring pumps of which the accuracy of delivery is affected by the lowering of the liquid in the supply tank to a point at or near the intake end of the suction pipe shall be provided with a device which will make the pump inoperable during the continuance of this condition, or shall be so constructed as to warn the purchaser and the operator in a conspicuous and distinct manner that the level of the liquid supply is so low as to endanger the accuracy of the measurement.

In relation to that specification, the committee suggests that it be withdrawn as a specification and be included in a general note to follow all of the specifications to the effect that it is the belief of the conference that such a device is highly necessary and that it is to be expected that at some future conference an effort will be made to incorporate that in the specifications when it becomes apparent that there are devices on the market to take care of that particular feature.

The CHAIRMAN. Does that cover your case, Mr. Stewart?

Mr. STEWART. That is the one I am alluding to, but it would not cover my idea.

The CHAIRMAN. Let us have your idea.

Mr. STEWART. I want to say to the conference that thousands of pumps will deliver gas whether it is there or not. We have had a little experience with that in the State of West Virginia, emphasizing this statement that I want to tell you about. Down in the city of Wheeling a man owning a garage left for a while and left another party in charge. After being gone for about an hour he returned and he said, "Well, did you do any business while I was gone?" The man said, "Yes; I sold a quart of oil and 10 gallons of gasoline." The owner of the garage looked at him for a moment and said, "Where did you get the gasoline?" He said, "Why, out of the tank." The owner said, "There has not been any gasoline in there for six weeks."

Now, the point I am making is that there is no way to tell when the tank is empty. The purchaser or the operator can not tell unless he is noticing the end of the hose pretty closely. Now, this requirement should not be tentative. It should not be put off to some future time—nothing is gained by that. These manufacturers can put a device on there that will warn the operator and the purchaser when such tanks become empty, and I believe they ought to be asked

to do it now. It may not appeal to the operator right now, but we are weights and measures men, and it does not make any difference to us whether the manufacturer altogether agrees with us or not; when we see that there is a chance for defrauding the public it is up to us to defend the public. Such a device can be put on, and I think it ought to be. That section 13 ought to be adopted just as it is in the tentative specification that we have been operating under for the last year.

Mr. Ramsdell. Mr. Chairman, this idea is not a new one to the industry, and it had attention from the industry long before it was ever suggested before this body. We have spent a great deal of money and time and effort to develop such an instrument, but have failed. We are ready to do anything that is possible, but we can not do the impossible. We may some day solve the problem, and when I use the pronoun "we" I refer to the Bowser Co. and to our own company, and to the Wayne Co., which Mr. Bean just tells me has also worked over the problem. It would be very nice if we had something that would automatically stop the pump, but it is an impossible problem to-day.

Now, we are heart and soul with you, gentlemen, in an effort to see that the public gets what they want, and that they do not get 10 gallons of air when they pay for 10 gallons of gasoline. We do not want that any more than you do. We do not know how to meet that specification to-day. Therefore I think it ought to be deleted until such time as we can come forward with a device, and you can rest assured that the competition in the industry is sufficient to keep us all awake on all of these matters, and as soon as some fellow has a device that will do that we will all know about it, and it will be adopted very readily.

Mr. Goodwin. Mr. President, having had some practical experience in this matter of pumps for a great many years I believe it is a simple problem to solve anything, although, perhaps, it will not be a perfect thing that will indicate as the specification reads that the gasoline or any other liquid in the tank is low while the operator is using it. This should be adopted here and now in the interest of the general public or the consumer. From practical knowledge I believe it is a simple problem to solve.

The Chairman. Let me ask you this question: In a case of this kind do you think it is better to arbitrarily say right now that they shall do it, or make the suggestion that they have an opportunity to do it in the near future?

Mr. Goodwin. I am willing to be liberal and give them time. I would like to say I have ideas on the subject that I believe could be installed for that purpose, that would not only be simple but inexpensive. It is not a positive thing, but merely an indicator that the gas or liquid in the tank has gotten to a certain place where it is dangerous to operate the pump any longer in the interest of the public.

The Chairman. Do you not think it would answer the purpose if we expressed our approval of such a device?

Mr. Goodwin. Yes; I think the specification as read by Mr. Holbrook covers the point.

Mr. Holbrook. The committee stands on their recommendation.

Mr. Goodwin. I think it ought to be acted on, if possible, or put

on the market as soon as practicable—as soon as it can be done—by the pump manufacturers, and as a protection, as I see it, to the public.

Mr. REICHMANN. I move that we adopt it.

Mr. GOODWIN. I second the motion.

Mr. STEWART. I move to amend the motion by adopting section 13 as in the original specifications.

Mr. HOLBROOK. If we adopt that as in the original specification, exactly the same conclusion is reached, since that was specially starred last year, with the explanation that that specification was not intended for immediate enforcement.

Mr. STEWART. You can put a device on there to speak to the purchaser and operator of the pump. It is the thing I have thought on for a long time, and have never been able to think it out. I admit that I have not any suggestion to offer; but since I have been here I have seen such a thing exhibited right in this conference, and it is over there now, to be seen.

Mr. RAMSDELL. There are two suggestions that the sealers can make to the buying public that will go a long ways toward solving the problem. I drive about a good deal in the New England States, and I buy gasoline in all parts of these New England States, and sometimes over in New York State, and there are just two things that I do before I am satisfied with the purchase and pay for it and go away. One is to see that the gasoline begins to flow when the operator begins to turn the handle, and the other is that he puts it through the full stroke. When he does that I think I am getting all I pay for, whether it comes out of our pump or one of our competitor pumps. I am satisfied with the purchase if it comes out of a pump made by a reputable concern, and there are a great many reputable concerns in the business. I think, if you instruct the public a little bit, we will accomplish—I do not know that I should say as much as will be accomplished by this specification, but I think pretty nearly as much. Tell them to see that the gasoline begins to flow at the time the operator begins to crank, and that he put it through a full stroke.

The CHAIRMAN. I think it is all right to make it possible for the public to know and find out what they ought to know, with a reasonable degree of attention on its part. I question as to how far we can go in making fraud impossible, or guaranteeing the purchaser the right thing without his showing the slightest attention on his part. Where would we stop if we went on with this principle of requiring, for instance, that operators should give all that was paid for without the purchaser ever seeing that the gas flows.

(The amendment was put to a vote and was rejected.)

(The original motion was put to a vote and was agreed to.)

Mr. HOLBROOK. It is suggested by Mr. Cummings, of Massachusetts, that specification No. 9 has not as yet been finally adopted. That occurs on page 5.

I do not know just exactly the status of that specification; I remember it was taken up and considered, and an amendment was introduced, but whether the specification was actually adopted as it stands I do not know. I do know that no action was taken on the amendment.

Mr. Neale. The record will show the situation on that to be that there was offered an amendment to new No. 9, and the conference will remember that after some discussion Mr. Bean, representing the Wayne Co., being interested in what was being brought before the attention of the conference, was asked to produce it here to help clarify the question as to the use of such a scale. My idea in bringing it before this conference was not to take from the trade something that might be valuable. It was rather calling it to the attention, if you please, of the weights and measures officials, so they would have a chance to crystallize their own idea about such a scale. That is all there was to it. Hence, it never was acted upon. It is still open. No. 9 has not been cleared up. It remains over for your consideration.

The Chairman. Is there any objection to No. 9 as it stands?

Mr. Neale. There were only two lines to the amendment; it is very short, and I can read it.

The Chairman. Let us have it.

Mr. Neale. Under the heading, "Indicating and registering parts," an addition was proposed after the word "ones," the last word of that paragraph, and the addition was as follows:

> The graduations on lineal scales shall be parallel to each other and perpendicular to the longitudinal axis of the measuring chamber.

Now, the only object of that, according to my understanding, from my own personal disfavor of those slanting lines, was that if it was the idea of this conference that it was physically impossible to meet the idea I had in mind of parallel lines, all well and good; but I think Mr. Bean should be given the privilege of discussing that now because that is what the instrument is here for.

The Chairman. What is the objection to the diagonal lines?

Mr. Neale. These officers all know that this is an ingenious engineering principle. No matter what adjustment you make here [indicating on the device] you do not have to change the line up here, because when you make that adjustment you will at some place intersect the proper line, if you please, at some point.

The Chairman. The diagonal line is very frequently used to compensate for change of rate, and a lot of things; it is a very useful device in many cases. Should it be objected to here? What is the objection to it?

Mr. Neale. I would really have to take this scale off.

Mr. Bean. That point is rather blunt, as designed.

The Chairman. I do think these slanting lines should never be used except in connection with perpendicular lines parallel to the axis of the chamber. They never should be used except with straight lines up and down.

Mr. Bean. Do you mean a vertical line parallel to this line or the other side, and adjustable so as to be moved across and be sealed if it is so desired?

Mr. Neale. The thing I brought before the conference is this: The officers with whom I come in contact in my own State daily, and the public at large, have looked at it and said, "Why are they arranged that way?"

Mr. Bean. May I have the floor for a moment?

The Chairman. You may.

Mr. BEAN. I do not dare to pump it, because I am afraid there might be a little gas in it. I think the real objection that has been stated is more to the pointer than to the scale. The distance between the various graduations on any vertical line is always the same. This is a compensating device, so that when the pointer is set for any graduation or any quantity, after the quantity stop has been sealed, then the pointer indicates correctly for every other quantity. I have shown here very crudely, with a piece of cardboard and a line, an idea advanced by Dr. Reichmann which might do away with a great deal of trouble. We could put an aluminum flag on there with a fine line, possibly making these lines a trifle finer than the end of this line [indicating], which would intersect with each graduation. We could also have an adjustable sliding scale that would be moved over there, so that the three would come in perfect coincidence.

The CHAIRMAN. Would you offer this as an amendment?

Mr. NEALE. This appears regularly in the record as an amendment to specification No. 9.

Mr. GOODWIN. I would like to ask you, sir, how much trouble it would be to you to draw a horizontal line which would show where the pointer ought to be when the quantity is delivered? Would it be a hardship to draw a horizontal line across the scale that would intersect with the line now drawn, and indicate that the horizontal line was to intersect with the vertical line?

Mr. BEAN. The flag would constitute the horizontal line. Other lines would not be practicable for the reason that that horizontal line changes as the adjustments are changed by the sealer. That would have to be a vertical line that would move over to some particular graduation.

Mr. FRARY. For an instrument for laboratory use, I can quite see that such an arrangement as this could be well used, but on a device which is to be used by the general public, with an indicator which is to indicate to the general public any quantity, I think it is most objectionable, and experience in the field shows that, contrary to Mr. Bean's statements, the operators operate it improperly. His own demonstrator over here demonstrated it to me improperly day before yesterday and laid himself open to a charge of improper use of the device. It certainly is a most objectionable feature. I can see no reason why this—of course, it is not up to me to see the reasons, however—I can see no reason why they should not be made as this amendment proposes; that is, at right angles to the line.

Mr. BEAN. I think, Mr. Chairman, that the objection would be met by the use of the flag. This is a very important matter; it covers the redesigning of the model.

The CHAIRMAN. This was discussed yesterday.

Mr. BEAN. I would like to state, just briefly, that it covers the redesigning of 8 models, including 11 types. Those who are familiar with industrial conditions to-day know that that would occupy a period of three years, approximately, to make drawings and secure patterns for these parts. We have parts for several thousand pumps in stock. I think an accurate survey of the use of the pump will show that the percentage of misuse is extremely small, and the same liability to error would occur with a scale carrying parallel lines. You have got the opportunity to go to both sides of the line. If we

agree to redesign the pointer so you can not use two sides of the pointer, and use the vertical arrangements so that three points have got to be brought into coincidence, I believe that every precaution has been taken so they can not misuse the pump in the future. As I explained to two or three gentlemen this morning, we were dissatisfied with this pointer ourselves and started to redesign it several months ago.

The CHAIRMAN. There is no objection to the pointer. That can be easily fixed. It is a question of whether we should have diagonal lines on the scales. If the motion was adopted, all you would have to do would be to adopt the other scale.

Mr. BEAN. No; we would have to redesign the whole thing.

The CHAIRMAN. Not the whole pump?

Mr. BEAN. Everything from here up [indicating] would have to be redesigned, practically every part; all the trips and gears would have to be redesigned.

The CHAIRMAN. If it is not the proper thing to use you ought to redesign it.

Mr. BEAN. I believe it is proper.

The CHAIRMAN. You have heard the amendment. Are you ready to vote on the question?

Mr. NEALE. May I say, in justice to the manufacturer——

The CHAIRMAN. We do not want to work any hardship on the manufacturers at all.

Mr. NEALE. I think I find in the specifications, which were enacted after I proposed the amendment, a feature which takes care of the situation, perhaps, and, if that is there, with the consent of my second, I will withdraw the proposed amendment to the specification.

Mr. STEWART. No; let it go through.

Mr. JOHNSON. Mr. Chairman, this is to the point simply—if Mr. Neale will grant me the privilege?

Mr. NEALE. Yes.

Mr. JOHNSON. At the time this matter was presented, I personally recited my experience with it, and did record an objection, but I want to withdraw my objections as well, in view of the apparent intention on the part of the manufacturer to do certain things which will, in a measure, correct it; and I am sure the manufacturers have a consensus of opinion to the effect that there is an intention on the part of the conference to hope for a correction in the future, and with that in mind, the manufacturers will be cognizant of the disposition of the conference. Any objection I had, as stated prior to that, I also withdraw.

Mr. IRVINE. I move the adoption of the original section.

The CHAIRMAN. The amendment is before us; it was seconded, but I think the mover and the second have withdrawn the amendment. As I understand, you withdraw the amendment with the consent of your second?

Mr. NEALE. Yes, sir.

The CHAIRMAN. The motion before the house is to adopt it as reported by the committee. Are there any remarks?

Mr. HOLBROOK. Mr. Chairman, just one thing. If it is considered that some other specification which has already been carried takes care of this matter, I think the expression of the conference should

be gotten on this specific point, rather than to withdraw this thing from the conference and not allow the conference to express their opinion as to whether this is the right construction or not, depending upon some other point in the specifications which may have been overlooked, which might be considered to bar this scale. In any event, does it not seem reasonable, this matter having been brought up and discussed, that the conference, for the instruction of the people who are going to enforce these specifications, should vote in some way upon this scale, rather than to depend upon a specification to eliminate it, which has not been considered as affecting this scale up to this time, and which has already been adopted?

The CHAIRMAN. What is the part of the specification, Mr. Neale?

Mr. NEALE. It is at the bottom of page 5, in the middle of the paragraph.

The CHAIRMAN. That covers the case very well, but it does not include the diagonal line. It says:

Pointers and indicators are required to be symmetrical about the graduation lines at which they may stand.

Mr. STEWART. The way I read that, it does not cover that. I can not see it, and it is not a question of what we may plan in some office; it is a question of what we meet in the field. You can go out here in Washington, I believe, and find two of these pumps, and go to the operator of one and ask him where the gallon or half gallon comes to, and he will tell you one thing; and you go to the operator of another, and he will tell you another thing. Now, I have had them do that very thing, and that is the reason I think it ought to be changed; and, if the mover of the amendment has withdrawn it, if I can get a second, I move that the amendment be adopted.

Mr. GOODWIN. I will second the motion.

Mr. FRARY. It happens that I made that motion the other day, and I am not willing to withdraw it.

Mr. HOLBROOK. I still think this sentence which Mr. Neale reads, in new No. 10, "pointers and indicators are required to be symmetrical about the graduation lines at which they may stand," does not cover it with sufficient clarity to satisfy a court, and I believe we might as well be clear about it now. If we want the lines to be parallel and perpendicular to the axis of the chamber, let us say so now. Part of us are going to understand that the question is covered under this, and we will go out and make rules and regulations accordingly. Those rules will not be in the interest of uniformity. So, I think, we should adopt the amendment as made the other day, or else reject it, and have a clear understanding of the matter. The motion made the other day was to adopt Mr. Neale's suggestion to add the words, "and all graduating marks on lineal scales shall be parallel to each other and perpendicular to the longitudinal axis of the measuring chamber."

The CHAIRMAN. Now, in looking into this I thoroughly agree with what Mr. Holbrook has said. There is no use leaving this off here because it is covered somewhere else. It may be construed properly, but the language which covers it is not clear at all, that is:

Pointers and indicators are required to be symmetrical about the graduation lines at which they may stand.

That brings up the question of what you mean by symmetrical.

Mr. HOLBROOK. I may say that in writing that specification this committee did not have this particular scale in mind.

The CHAIRMAN. If we come down to the last analysis as to what we mean by "symmetrical"—and you would have to define your conditions—it would not be very easy. It would be pretty hard to say whether the pointer was "symmetrical" to a lot of lines; so there is a doubt there, and I am inclined to think we had better take it up and settle that amendment that Mr. Neale proposes.

Mr. STEWART. It has been moved and seconded.

Mr. RAMSDELL. May we have that read once more? There was a word or two in it that I did not get.

Mr. FRARY. I have it just as I wrote it the other day:

That graduations on all lineal scales shall be parallel to each other and perpendicular to the longitudinal axis of the measuring chamber.

The CHAIRMAN. All those in favor of leaving this wording as it stands will say "Aye," contrary "No."

The motion is carried.

Mr. SCHOENTHAL. In reference to the example which Mr. Stewart drew, of two operators in the District of Columbia, one of whom says the bottom and the other says the top, it shows that the operator can use either, and if he uses the top he is out of luck.

Mr. HOLBROOK. For the sake of the record, I would like to ask if that question was put in such a manner that it will be absolutely clear. Was the amendment accepted or was it rejected?

The CHAIRMAN. It was accepted.

Mr. JOHNSON. I thought the vote was on the interpretation or meaning rather than on Mr. Neale's amendment.

The CHAIRMAN. His amendment was that those words read by both of them should be added after the last paragraph, under specification No. 9, and that is the way it was put.

Mr. GOODWIN. I move you, sir, that the original amendment as read shall be approved. I mean the specification as amended be approved.

The CHAIRMAN. It is in order now to pass the whole No. 9 as amended. Those in favor of passing No. 9 as amended, and the amendment is the adding of the words after the paragraph, "and the graduations on all lineal scales shall be parallel to each other and perpendicular to the longitudinal axis of the measuring chamber." Is that clear, Mr. Johnson?

Mr. JOHNSON. Yes.

The CHAIRMAN. Mr. Holbrook insists that the amendment has not been voted upon, but it was very clearly stated that all those in favor of adding those words to that paragraph would say "aye." I will put that motion now with reference to the paragraph.

(The motion was put to a vote and was agreed to.)

Mr. HOLBROOK. It is to be suggested at this time in reference to specification No. 19 that a proviso must be added to that specification, making it unnecessary to drain the hose line in cases where the specification says a valve at the end of a hose is allowable. That is purely formal; the conference has gone on record as in some cases allowing a valve in the end of the hose. A proviso should therefore be passed to specification No. 19, to the effect that where the hose

line need not be drained under the terms of specification No. 18, then this specification as regards the draining of the hose is inapplicable.

The CHAIRMAN. You have a note under No. 19?

Mr. HOLBROOK. No; not as reworded. This specification, in brief, required hose lines to be drained. The conference has now gone on record as saying that some pumps may be operated with the hose line always full. An amendment is necessary to specification No. 19, to the effect that when, under the wording of specification No. 18, the pump is to be operated with the hose always full, then the hose need not be drained under specification No. 19.

Mr. BARNARD. Is that particular specification under consideration now?

The CHAIRMAN. This is a question of a note of explanation in regard to No. 19, as I understand it?

Mr. HOLBROOK. Yes.

Mr. BARNARD. I wanted to ask Mr. Holbrook whether the committee during their deliberations have considered the question of safety at all? The question was brought up in the early meetings, after Mr. Small's paper relative to the fire-hazard conditions. It was suggested that we might consider the matter of safety as a special point of interest, under a note or under a resolution, or possibly under a specification, and I was wondering whether we had not overlooked that and whether Mr. Holbrook and the committee had considered it.

Mr. HOLBROOK. It has not been overlooked to the extent that where there are any existing laws or ordinances of States and cities, or regulations of the State and local fire marshals, in regard to safety requirements, then it has been stated that the inspectors of weights and measures will be unable to put certain of these specifications into effect until those conflicts in the codes have been resolved.

The CHAIRMAN. I would go still further than that, Mr. Barnard, and request these gentlemen to call the attention of the city officials to any ordinances which are not directed toward safety, and so on. Let us do some constructive work along safety lines.

Mr. BARNARD. My reason for bringing that point up right now was in order that we might work in cooperation and harmony with the underwriters. As a rule they are a mighty fine bunch of fellows and good engineers, and if it is possible we should cooperate with them.

The CHAIRMAN. I quite agree with you, and the statement of Mr. Holbrook covered that. You must, of course, conform to their regulations, and in your use of these devices and in the handling of this inflammatory material a great deal of useful information can be secured. I think you can secure more from those who have the construction of your ordinances, and it ought to be made use of.

Mr. STEPHENS. I would say in this connection that when the underwriters came to discuss our machines this particular matter was taken up with them, and they said the way our pump was operated was satisfactory. When Mr. Small was here yesterday I knew this question would come up for discussion, and I took the matter up with him, and he said, "We do not draw any special line on that, and where it is safe we are satisfied."

They express themselves with reference to our particular machines and pumps that they were really safer than the ordinary, because there was no spilling of gasoline.

The CHAIRMAN. Is there any objection to this proviso? [After a pause.] If not, it stands approved.

Now, I understand it will be necessary to pass on these specifications as a whole. That is customary. Will some one make a motion?

Mr. BARNARD. I move you, sir, that the specifications and tolerances as passed upon by this conference, section by section, be now adopted as a whole.

Mr. IRVINE. I will second that motion.

Mr. SMITH. I think before the specifications are definitely adopted by this conference, some understanding should be arrived at as to which of these specifications are to be immediately enforced, which are to be nonretroactive, and matters of that kind. I think a definite understanding should be had on that before action is taken.

Mr. JOHNSON. Mr. Chairman, it was decided and agreed upon by the specifications committee that each one of these specifications will be carefully considered with the manufacturers and with the various departments, and it will be guided in its determination in that respect entirely, with the object in mind of doing what is right and proper and practical. It would be almost an endless matter to take up each specification now, with that purpose in mind. Therefore, I crave the indulgence and the confidence of the conference in their specification committee to do what is right and proper in that respect.

Mr. STEWART. Now, we are adopting new specifications. We have got hundreds of these pumps in our various States. Are these specifications going to apply to pumps which are now installed? The manufacturers have pumps completed and ready to be shipped; they have some in transportation now. These are to be installed. Are these specifications going to apply to them? It does seem to me to be wise to set a time when all new pumps should comply with these specifications, and also when they should be retroactive as to the pumps that are now installed.

The CHAIRMAN. I understand that these have been in operation for a year as tentative specifications. Do you think it is necessary to have still further time?

Mr. STEWART. We have the old pumps that have been installed. These specifications have not been rigidly enforced; we have been trying them out. That was understood at the last conference, and if we go back home and enforce them we will put three-fourths of the pumps out of business which are now installed.

Mr. HOLBROOK. Under the terms of Mr. Johnson's resolution the recommendations of the committee as to retroactive specifications and nonretroactive specifications would go out with these specifications.

Mr. BEAN. In the case of this particular amendment regarding this scale, if that was made to be enforced at once, it would mean that our factory must close its doors to-night. I explained to you that under the present industrial conditions it would be beyond the possibility of any organization to redesign such a pump and get the

patterns and material under two or three years, and it not only covers this one 5-gallon pump which we are showing here, but it covers eight models, and includes eleven types. It would mean that we would close our doors immediately. I do not believe it is the desire of the conference or of the Bureau of Standards to work any such hardships on the manufacturer.

The CHAIRMAN. Not unless it works an equivalent hardship on the public. If it is a thing which works hardship on the public, it may be better to concentrate on one.

Mr. REICHMANN. Does not that resolution of Mr. Johnson's cover that point?

The CHAIRMAN. There is no disposition whatever to be arbitrary about these matters.

Mr. RAMSDELL. Mr. Chairman, there is—and I think the committee has it in mind—a great deal of equipment in the field, and roughly speaking I should say it perhaps represents $100,000,000, and I presume they are going to give that consideration. I dare say that the manufacturers of pumps to-day have in stock, completed and in their warehouses, and in process through the factories, perhaps, we will say—well, our inventory is pretty large, and I presume the others have a large inventory—so it probably runs into millions of dollars, a great many millions of dollars, and we would like to have that given consideration. We do not want to postpone this thing any longer than necessary, but we do want to have these things given consideration when this question is considered.

The CHAIRMAN. These specifications may not affect a single thing you turn out.

Mr. RAMSDELL. I rather think that may be so. I think that is what Mr. Johnson had in mind.

The CHAIRMAN. There has been a gradual movement toward this. The main parts have been covered in the past year. We still have these outstanding questions. It is not the intention of the committee or the conference to work any hardship in cases of this kind, but if we are decided that that is the wrong thing to do, then we must set about to correct that. It is not going to take any two or three years to correct it, but at the same time we ought not to take the position of having it corrected unless we can show a good cause for its rejection.

Mr. NEALE. I can not quite agree with Mr. Bean that it means an extensive rebuilding of that pump. All that pump needs done to it at the present time is to do as other makers do. Take that chart off, which never meant anything. The pump still has its measuring elements; it has its stops, and more stops can be put on it. Indeed, I can not see with the fixed stop, why it is so important there to have something to tell the public what he is getting. The operator forgets it is only something to please the public although the operator uses it as a measuring device, universally or practically universally. Hence, if I owned that pump which is a splendid measuring device, I would take that chart off if it is objectionable. Two screws will remove that scale. However, as a sealer, I am going to comply with what the conference says.

Mr. STEINEL. Even if the manufacturers allow these dials, they ought to be taken off and not used at all. I have had many of these

dials taken off. We see scales with indicators and diagonal lines, and they are eyesores to us. We have told our peddlers and junk dealers for 10 years not to have indicators that are bent, and if they find these things they ought to do away with them. I would rather see a pump without any scale at all on it than to see one of these.

The CHAIRMAN. I think, Mr. Bean, you ought to extend a vote of thanks to these people for calling your attention to these things; and I think the manufacturers generally ought to take that attitude. If I were a manufacturer, I would come to this conference with the idea of getting good suggestions, and it seems to me that these people who are dealing with the public, who know what they are up against, and what the people really do and think about, can give rather good advice in these things.

Now, on the other hand, whatever change is made should be made in a proper manner. We do not want any unnecessary hardship, of course. I would like to see that condition brought about, for these gentlemen here are giving you the benefit of their experience in order that you may incorporate it in your equipment. That is what the bureau does in all its work—we take up points which will be of benefit to the industry as a whole. Now, who is better prepared to speak about this than these men who are using the things and testing them every day? Is that not right?

Mr. BEAN. To a certain extent, yes.

Mr. JOHNSON. I agree with the Doctor's remarks, and from the impression I have, I take it that that specification is merely tentative, as I understand it.

Mr. STEWART. No; nothing is said about its being tentative.

Mr. REICHMANN. That resolution of Mr. Johnson's covers the situation, it seems to me. Those of us who have had experience in ward politics, and so forth, know lots of these things are handled that way, and you have to see the boss. The principle is the same. They should take all points like that up with the tolerance committee.

The CHAIRMAN. We have two resolutions before us. Of course, technically, we can have but one; but two points are to be considered—Mr. Johnson's resolution in regard to the committee, and Mr. Barnard's resolution in regard to adopting them as a whole. I think Mr. Johnson's point should be taken care of first.

Mr. JOHNSON. It was not a motion, Doctor; it was simply an impression I have taken from the explanation you made in the matter.

The CHAIRMAN. I referred to your previous remarks, to the latitude given the committee in the preparation of the specifications.

Mr. JOHNSON. In order to make that perfectly clear, I beg to suggest that a resolution be prepared and introduced by the resolutions committee, if that is agreeable, and then we will have it in definite form, and it will be clear.

The CHAIRMAN. I wanted to get that point cleared up. Mr. Barnard's motion to adopt the specifications as a whole is before you. Those in favor say "Aye"; contrary, "No." It is carried.

Mr. BARNARD. It seems to me at this point there is one little matter that we can all be harmonious on, and I think each and every delegate here will agree to it, and as I have been given to understand

by the chairman of the resolutions committee that it is not included in their report, I am not usurping any of their prerogatives. I wish to move you, sir, that this conference extend to the committee on specifications and tolerances a rising vote of thanks. Gentlemen, I have spent some 10 days in Washington previous to the conference, and this committee has been working constantly and diligently, and they have been subjected to criticism from every corner of the room—naturally, all good-natured criticism—and I think, ladies and gentlemen, that they are entitled to a rising vote of thanks. Accordingly, I submit that as a motion, Mr. Chairman.

(There were several seconds to this motion.)

Mr. IRVINE. May I suggest that that motion include a vote of confidence?

Mr. BARNARD. I accept the amendment.

(The motion as amended was put to a vote and was agreed to.)

DISCUSSION OF CONDITIONS AND REMEDIAL LAWS.

Mr. STEWART. This conference yesterday afternoon saw fit to take a recess and, therefore, the members of the conference went out to various places, some to see the sights of the city and some to the ball game, but I went to the market. I found some things down there that do not comply with the specifications and tolerances being used by the bureau, and I would like to ask a few questions.

The CHAIRMAN. What bureau?

Mr. STEWART. The Bureau of Standards.

The CHAIRMAN. We have nothing to do with that—no more than what we have to do with what goes on in your State.

Mr. STEWART. I just wanted to ask a few questions.

The CHAIRMAN. All right, if the representative of the District is here. Is Mr. Roberts here? I want to call attention to the fact that we have still two papers on the program.

Mr. STEWART. I noticed them down there using the double-ended measure, which is prohibited by the specifications. I noticed in use a liquid quart measure for the sale of dry commodities, and I noticed the selling of foodstuffs over a scale graduated to 2 ounces, and several things of that sort. I just wondered whether the law is insufficient, or what is the matter?

Mr. ROBERTS. Mr. Stewart, I quite agree that you saw things that were incorrect. These double-ended measures in the District of Columbia are specifically legalized by act of Congress for the District of Columbia, and the weights and measures officials of the District have no authority to condemn them—in other words, we are compelled by law to approve them. The weights and measures law of the District of Columbia does not grant to any official the authority to adopt and promulgate specifications. That covers what you say about scales. I thoroughly agree with the inference which you make, that scales with 2-ounce graduations should not be used in selling foodstuffs, but, as the law now stands, we have no authority to condemn them. I will say, further, that for some three years, I believe, I have been making an effort to get Congress specifically to revise our entire code of weights and measures laws. I will give you a copy of the proposed measure.

The CHAIRMAN. This whole discussion is entirely out of order. Mr. Stewart said he wanted to ask a few questions, and I said he might if the representative of the District was here. We have these two papers to get off.

Mr. ROBERTS. That bill passed the House of Representatives during the last Congress, but died in the Senate. I had a similar bill reintroduced early in the present Congress. I have revised it to some extent and improved it some. It has again passed the House of Representatives—it passed last Monday.

Mr. STEWART. I would like to have this conference go on record as being in favor of the adherence of the District of Columbia to the specifications put out by the Bureau of Standards.

The CHAIRMAN. Are you willing to make that motion apply to all States?

Mr. NEALE. I think the point is out of order.

The CHAIRMAN. Your point is well taken.

Mr. ROBERTS. I did not get that. Will you please explain it again?

Mr. STEWART. I said that I would like to have this conference go on record to the effect that the District of Columbia and all States, as far as that is concerned, should adhere to the standards of the Bureau of Standards.

Mr. ROBERTS. If the conference were to do that the conference would go on record as advocating a violation of law.

Mr. IRVINE. May I have the indulgence of this conference for a moment? I just want to make the statement that the District of Columbia has written all over the United States and asked for copies of State laws in order that they might model laws for the District. I think, if they would go to the fountain head and ask Congress to pass the legislation recommended by the Bureau of Standards instead of going to the different States and getting a compilation of useless laws—junk—they would get the things they want.

Mr. ROBERTS. I just want to say that I have not asked Congress to pass any junk at all. I did ask Congress to consult the statutes of the various States and the ordinances of the various cities and the model law prepared by the Bureau of Standards, and from those laws I got many ideas that I believe were valuable in preparing the bill. I see no reason why any man should not get all the information he can, and he can object to what he believes is unwise and use what he believes is wise.

The CHAIRMAN. I want to say that it is the desire of the bureau to assist in every way we can. We can not go into any State or into the District of Columbia and say "You shall do so and so," but we are here and will be glad to help you in any way we can.

Mr. ROBERTS. I have consulted the bureau and have got some very valuable assistance from the bureau. I have one letter from you that I was able to use to very great advantage in getting the bill through the House.

CONSIDERATION AND ADOPTION OF SPECIAL RESOLUTION.

Mr. JOHNSON. Mr. Chairman, I move to suspend the regular program for the introduction by the chairman of the resolutions committee of a resolution wherein this conference is much concerned.

The CHAIRMAN. A motion is before the house. All in favor say "Aye." Contrary, "No." The motion is carried.

Mr. MOTE. Is the conference going to meet this afternoon? I have a report here from the resolutions committee.

The CHAIRMAN. We will not have time now for the whole report, but we will make it the first order of business after lunch.

Mr. MOTE (reading):

Whereas the attention of this conference has been called to a pamphlet entitled "Bureaucratic Control of Weighing and Measuring Devices," issued by the so-called American Institute of Weights and Measures; and

Whereas many statements and accusations printed therein and directed against officials of the National Bureau of Standards are known to this conference to be false and malicious; and

Whereas the statement on the front cover of this pamphlet which reads as follows: "In plain disregard of this law, the officials of the Bureau of Standards have made it the central station of a vast organization of officeholders for the purpose of securing national and State legislation that will accomplish two things—extend the power of these officials and make the exclusive use of the metric system compulsory in the United States," misrepresents a movement for honest weights and measures, and by so doing has a tendency to retard the activity of all weights and measures officials in the protection of the public; and

Whereas the last paragraph of said pamphlet intimates that some improper connection exists between the officials of the State of Massachusetts and the officials of the United States Bureau of Standards, which statements are known to this conference to be false and untrue; and

Whereas this conference considers the accusations to be an insult to the honesty and integrity of all officials engaged in this work: Therefore, be it

Resolved, That the Thirteenth Annual Conference on Weights and Measures emphatically resents this unwarranted attack upon the officials of the National Bureau of Standards and others: And be it further

Resolved, That the delegates of the States represented at this, the Thirteenth Annual Conference on Weights and Measures, express their implicit confidence in the director and other officials connected with the National Bureau of Standards and go on record as being in entire accord with the constructive and protective work being carried on by them: And be it further

Resolved, That copies of this resolution be placed in the hands of those interested in the subject of weights and measures regulation.

JNO. M. MOTE.
S. C. DINSMORE.
W. T. WHITE.
FRANCIS MEREDITH.
R. W. SMITH.

The ACTING CHAIRMAN (Mr. Johnson). Gentlemen, you have heard the reading of this resolution. What is the pleasure of the conference?

Mr. BARNARD. I move you that this resolution be adopted by this conference.

Mr. MURRAY. In speaking for this motion I think that it might be well for me to acquaint the conference concerning this onslaught by Mr. Dale, who delivered his speech before the mercantile affairs committee in our Massachusetts Legislature. This pamphlet, which bears the name of the American Institute of Weights and Measures, is almost a verbatim report of his speech at that time.

A bill was introduced in the Massachusetts Legislature by the State department of standards, with the approval of the Massachusetts Association of Sealers, that called upon the sealers of the Commonwealth to work in accordance with the regulations of the Bureau of Standards. This Mr. Dale is a very cultured and educated gen-

tleman, apparently, and I was amazed at his tremendous and unwarranted onslaught on the Bureau of Standards. He spoke for nearly a half hour, and throughout the entire speech not one moderate word did he say concerning the Bureau of Standards. Singular as it may seem, since this bureau has been in existence for so long, not one thing could he find to point to that they had done that was worthy of his praise. Our hearings are not ex-parte hearings in a general sense, but they are in a partial sense. The supporters had been heard in favor of the bill, and then Mr. Dale got up and made this speech, which amazed the committee on mercantile affairs, who were nearly all men of prominence in Massachusetts. I want to say that we had no opportunity for attacking Mr. Dale's remarks, because the committee would not allow us to do so, but had we had an opportunity the State officials and I would have answered Mr. Dale, and undoubtedly we might have disproved the statements contained in his argument against the bill. As it was, largely through misrepresentation and the violence of the attack on the Bureau of Standards, the bill was postponed until next year. I do not believe that there is a man in this conference who could have stood idly by for a moment in the attack that was made on the Bureau of Standards without challenging Mr. Dale, but we did not have the opportunity. Immediately following the hearing some of us very forcibly expressed our opposition to and our contempt for Mr. Dale's speech, but it evidently did not change his course. I understand that thousands of these circulars have been sent all over the entire country, and I do believe that we should pass this resolution, since perhaps it might affect any action in the future which would be disparaging to the Bureau of Standards.

The Acting Chairman. I believe, gentlemen, that the conference is of a mind in this matter. We might go on record as availing ourselves of the splendid admonitions given us last evening by Senator Lenroot, when he said that constructive work must depend on intelligent men; this man has our sympathy, and that is about all.

Mr. Irvine. To me it seems that this is an insult to every weights and measures official who is trying to do his honest duty—to every man engaged in the work—and it seems to me that it would only be fitting and proper, inasmuch as this speech was made before the Legislature of Massachusetts, for every official to write the Governor of that great State against this autocratic piece of work, against the action of this Institute of Weights and Measures, which is, I understand, backed up by some manufacturers who are afraid that they might have to spend a few cents in case the metric system is adopted. I suggest that we write to the governor expressing our opinions concerning this speech.

Mr. Cummings. Mr. Chairman, I wish to correct an impression that seems to have gotten out here. This talk was not made before the Legislature of Massachusetts, but before the committee on mercantile affairs.

The Acting Chairman. All in favor of the adoption of the resolution please stand. [After a pause.] Those opposed kindly rise. The resolution has been unanimously adopted by the conference.

WEIGHTS AND MEASURES EDUCATION IN THE SCHOOLS, BY JOSEPH J. HOLWELL, COMMISSIONER OF WEIGHTS AND MEASURES OF NEW YORK CITY.

Mr. Chairman, ladies, and gentlemen, before I read my paper of 1,000 words, which will only take a few minutes, I wish to say here that I have not come to criticize the District sealer or the District of Columbia. I am glad to note in the papers to-day that the House has passed the bill which he has recommended, and I believe it is our duty, we representing cities and States in this conference, to write to our Senators and ask them, now that the bill is before the Senate, to enact that bill.

Two things which have impressed me during the past two and a half years that I have been identified with weights and measures work are the splendid though comparatively small body of men and women in this country interested in the advancement of all measures for making possible true weight or measure in the purchase or sale of commodities, and the large body of men and women who are totally indifferent to the importance of this subject in the business and family life of this Nation.

My review of the work of my predecessors has brought me into touch with the work and the accomplishments of their contemporaries in the weight and measure field, and I have been surprised that notwithstanding the smallness of their numbers and the lack of proper financial support from their immediate official superiors that they accomplished such wonderful results.

I feel, however, that their achievements would have been impossible but for the wide publicity given to the work of weights and measures by the press of this country. The newspaper men of America have not hesitated to write up and denounce, if necessary, the individual or firm which attempted to practice short weight or measure in their commercial dealings, and to these men is due the molding of a public opinion which approves honest dealing in the purchase or sale of commodities and is supporting weight and measure officials in the execution of the law.

But I feel that notwithstanding the splendid strides which have been made in weights and measures during the past score of years that those who have been actively identified with the work have not achieved the results which they would like to have accomplished. During this period the budgets of many of our State and city governments have increased enormously, but few substantial increases have been granted to weight and measure officials for the proper execution of their work. The neglect of Government officials to appropriate sufficient money for the conduct of weight and measure work may be attributed to two causes: First, lack of knowledge of the importance of the work; and, secondly, the indifference of the great mass of the people. Without an organized, united demand on the part of the people, it is a rather difficult task to arouse interest in those public officials responsible for the appropriation of the public moneys into channels relating to weights and measures.

Weight and measure men have attempted to enlist the support of the general public. Housewives' leagues have been organized and the members of women's clubs throughout the country have been appealed to for the purpose of educating as many as possible in the

importance of honest weights and measures, but without appreciable results. This failure of accomplishment on the part of weight and measure officials has not been due, in my judgment, to any lack of efficiency, but the bigness of the problem of engaging the interest of the country was too large a work for so small an organization to accomplish.

To create interest in weights and measures we must begin our work with the children in the schools. The 20,000,000 boys and girls who are to-day attending the schools of America are the men and women who will a few years hence handle those commodities which are sold or purchased either by weight or measure.

In the curriculum of every grammar and high school of this country there should be taught the subject of weights and measures. Our educational authorities should be furnished with every kind of equipment pertaining to weights and measures in order that the school children may be able to visualize and to know readily the difference between a half-pound and a pound weight, to know how computing and other types of scales and measuring devices should be operated, how food packages should be marked, and how to sell or purchase commodities by weight or measure.

In teaching the subject of weights and measures to the school children of America we will do more than merely teach them how to sell honestly and how to purchase correctly. We will teach them at the same time the standards of honesty. In inculcating such principles in the minds of our school children during the formative and impressionable period of their lives, we are raising the standards of American citizenship. We will drive home the thought that the merchant should be honest, and that the purchaser should be honest as well.

We will emphasize, too, the importance of accuracy and exactness—that the merchant must give honest weight and measure, and that the purchaser must be alive to his responsibilities and insist that he obtains the true weight or measure of the commodity purchased.

As an initial step in this educational program the mayor's bureau of weights and measures of the city of New York has conducted demonstrations as to "How to read the scales" in the city's 25 high schools. To make these demonstrations a success the cooperation of five of the large scale companies was secured, to the end that these companies delivered scales to these schools which were worth over $20,000, without charging a dollar for their time and the expense they incurred in loaning their instruments. A remarkable fact brought out by these demonstrations, which were given before 15,000 pupils in the high school first-year class, was that not more than 50 of them knew how to read a scale. Those children have been invited to attend further demonstrations in our Manhattan bureau testing station in the Hall of Records, and the classes which have responded have become so interested in the weighing and measuring devices on exhibition there that their teachers have had difficulty in terminating the sessions. This experiment in the city of New York demonstrates to my mind the vital interest that school children have in the subject of weights and measures, if they are but given the opportunity to study it. With weights and measures as a part of school work, an auxiliary could be organized in this country, which

would be one of the strongest forces for good government that we could have in America. We would be training constantly along the proper lines the future manufacturers, merchants, and housewives. We would set a standard for business dealings for other nations and peoples to adopt.

This educational program should enlist the support of all weight and measure men. When I say "weight and measure men" I include not only the weight and measure officials of America, but also the men who have put their capital into the manufacture of proper weighing and measuring devices, the mechanical geniuses who have brought these devices to such a state of perfection, and the men who make possible their use in commerce by their ability to sell them. With the adoption of this subject as a part of our schools' curriculum we shall have done more to further the work of weights and measures than anything previously put forward by the weights and measures men of America.

The CHAIRMAN. The speaker discussed a very important point, and that is education with regard to weights and measures. It is too bad that the school child has to wander through this subject without any special demonstration—without any special effort being made to teach weights and measures.

MACHINE MEASUREMENTS IN RETAIL DRY-GOODS STORES, BY F. REICHMANN, FORMER SUPERINTENDENT OF WEIGHTS AND MEASURES, NEW YORK STATE.

I had some slides to show you, but unfortunately the operator of the lantern has not appeared on the scene, so I will keep you only for three minutes and talk on machine measurements of fabrics, which, as you perhaps know, has always been my hobby.

As you know, we are interested primarily only in the net result accomplished; namely, with what is actually given to the customer. We are police officials to enforce the laws, to see that all the people get all they are entitled to. The same applies to gasoline pumps, or what not.

To get an accurate measurement of fabrics is perhaps one of the most difficult things of all the various commodities dealt with in the retail trade, the reason being that you have elements of temperature, humidity, the elasticity of the fabric, and the human element of the handling, all entering into what is actually given, so that the definition of a yard of goods—and, mind you, that that is an area measurement, assuming that the width is constant—the definition of a yard of goods, which, so far as I know, has never been definitely established, we can safely assume to be the area of those dry-goods fabrics when laid upon a smooth table substantially without friction and without tension to the goods—in other words, just as a dressmaker lays it on the table to cut it out.

The oldest form of measurement was probably the linear measure—a form of the yardstick. In order to simplify that the next step was to use counter tacks. In a great many manufacturing establishments mechanical means of measurement have been adopted. For instance, packing machines, rewinding machines, and reeling machines. It has only been in the last few years that the mechanical measurement of dry goods has come into general use in retail stores. All devices

on the market—there are several of them—follow the plan of having a cylinder of definite circumference, the fabric being pressed on that circumference, and as the operator draws the fabric over that little roll, it, by some mechanical means, then operates a train of gears and registers the yardage of the goods to be delivered to the customer. These are generally combined in the retail machines with a price-computing device, which is a simple matter to connect. It is a simple matter to connect that train of gears, or whatever may be used, to the device which will indicate the price at the same time the goods are actually delivered. The great difficulties of the measuring of goods are, first, the nature of the goods, and, second, that when you consider the commodity delivered to the customer you can not differentiate or separate the human element from the machine itself. It is an entirely different mechanical operation from other determinations. On an ordinary scale you lay your goods on the scale and that registers what is there. With fabrics going over a roll or reel you still have the goods on the reel when delivering a part to the customer. The only analogy that I know of in a mechanical way is a weight-computing cheese machine. It is assumed that the cheese is uniform, and fabric is even less uniform than cheese. The matter is one that I would like to go into further. I did not know it would be so late, and I will take only a few minutes and read my paper later as I prepared it. All weights and measures officials will have to get acquainted with this intimately, because mechanical measuring machines have come to stay, and they fill the same want for the dry-goods merchant as an ordinary scale does for the butcher. Machines for the measurement of retail sales of dry goods are going to relegate the yardstick, etc., to the junk heap, and it behooves weights and measures officials to become thoroughly acquainted with them.

The Chairman. The hour has now come for luncheon, and I would request that you get back here promptly, as we have a number of things to attend to this afternoon.

(Whereupon, at 12.45 o'clock p m., the conference took a recess until 2 o'clock p. m.)

SEVENTH SESSION (AFTERNOON OF THURSDAY, MAY 27, 1920).

The conference reassembled at 2 o'clock p. m., Dr. S. W. Stratton, chairman, presiding.

The CHAIRMAN. The meeting will please come to order.

Is the chairman of the committee on resolutions present?

Mr. HOLBROOK. Mr. Johnson has gone after him.

The CHAIRMAN. He is right outside somewhere. Is the chairman of the committee on legislation present?

Mr. SMITH. I believe that Mr. Gregg, of Texas, is the chairman of that committee, and that he has not been in attendance at this conference.

The CHAIRMAN. It is the next committee that will be called on to report, and I shall ask you to act as chairman.

The following telegram was received from Mr. Gregg explaining his enforced absence from the conference:

AUSTIN, TEX., *May 24, 1920.*

DR. S. W. STRATTON,
President Annual Conference on Weights and Measures.

Regret exceedingly that it is impossible for me to attend this session of national conference. Legislature has just been called in extra session and important amendments will be proposed to present public weigher's law. It is thought best that I remain here to-day, as we have made wonderful progress under the present law, and we hope to be able to report to you results which are second to none of our sister States. You have my best wishes for a successful and profitable session. Kindly express my regrets to the conference.

D. A. GREGG,
Deputy State Superintendent.

Mr. Fischer is in receipt of a note from Mr. Franklin Brooks, a very well-known friend of honest weights and measures. This communication will doubtless be of interest to the delegates. It is as follows:

LARCHMONT, 6 ROOSEVELT AVENUE,
May 16, 1920.

MY DEAR FISCHER:

It's good to hear from a friend. Your letter was welcomed. I hope that I shall be able to attend the Weights and Measures Conference—the square-deal convention—the golden-rule advocates—more important in the long run than that other Weights and Measures Convention in Chicago in June. If, perchance, I can not come, give my best greetings to the faithful and true—what shall I call them—golden rulers? Some day our Government will have departments of health and of standards, more important than transportation, war, etc. I believe we will all live to see this. With kindest regards,

Hastily, but sincerely, yours,

FRANKLIN BROOKS.

CONSIDERATION OF SPECIAL RESOLUTIONS.

Mr. JOHNSON. I have two resolutions to present if you wish to hear them at this time. The first is a resolution which the conference has

requested, having to do with the matter as to which specifications shall be retroactive and which nonretroactive (reading):

RESOLUTION IN RE TIME OF APPLICATION OF SPECIFICATIONS FOR LIQUID-MEASURING DEVICES.[10]

Whereas the Thirteenth Annual Conference on Weights and Measures has adopted specifications and tolerances for liquid-measuring devices; and

Whereas it is the opinion of the conference that some specifications should be made retroactive, others nonretroactive, and still others should not be put into force and effect until some future date; Therefore be it

Resolved, That the committee on specifications and tolerances be instructed to incorporate in the specifications and tolerances their conclusions in this regard after consultation with manufacturers of liquid-measuring devices.

Mr. NEALE. I move the adoption of the resolution.

(The motion being seconded it was put to a vote and was agreed to.)

Mr. JOHNSON. I have another resolution here that I beg to have considered (reading):

RESOLUTION IN RE DESIGNATION OF DEPARTMENTS.

Whereas the National Bureau or Department of Standards has been so designated by a congressional act and whereas the name Department of or Bureau of Standards has always been considered a national institution: Be it

Resolved, That it be the sense of this conference that the name Department of or Bureau of Standards be confined in its use and reference only to the National Bureau or Department of Standards.

The CHAIRMAN. You have heard the motion.

(The motion was seconded.)

Mr. CUMMINGS. Does that resolution have any bearing on the Division of Standards of Massachusetts that is established by Massachusetts law?

Mr. JOHNSON. I have referred this matter to Mr. Meredith and he is thoroughly in accord with this resolution.

The CHAIRMAN. This is merely to guide you in the future. Are you ready for the question? Those in favor please say "Aye;" contrary "No." It is carried. Are there any further resolutions?

Mr. SMITH. As an individual, and not as a member of the resolutions committee, I desire to offer for the consideration of the conference a resolution which I believe covers a matter of importance. I hesitate to open up again the subject of liquid-measuring device specifications, since they have been finally adopted, and the matter closed, but I desire to offer it in the nature of a resolution, so that if it is the sense of the conference that this is a desirable proposition we might have the benefit of some official action of some sort to justify us in including the regulation in the specifications. I would offer the following resolution:

RESOLUTION IN RE SEALING OF NEW LIQUID-MEASURING DEVICES.

Resolved, That it is the sense of this conference that the correct position of such alterable devices as are described in specification No. 15 be determined by a factory test, and that they shall be sealed by the manufacturers.

My purpose in offering this is to provide for the interim between the shipment of a pump and the time when the sealer is able to place his official seal upon the adjustments, referring particularly to locali-

[10] In accordance with the terms of this resolution the committee has classified the specifications and its conclusions are incorporated in the specifications and tolerances printed in the appendix of this report.

ties where there is not a city sealer. In the State work it is frequently necessary for such a device to operate without a test for a considerable period. In my own State the law provides for a permit until it can be tested. This, I believe, will offer a valuable safeguard to the purchasing public during that interim.

The CHAIRMAN. You have heard this resolution. The gentleman wishes to offer it. It might be referred to the committee.

Mr. NEALE. To put the matter before the house, I move the adoption of the resolution.

(The motion was seconded.)

The CHAIRMAN. You have heard the motion, which has been seconded. Are there any remarks?

Mr. NEALE. Mr. Chairman, the manufacturers have long been of the mind that in addition to having provided means for sealing, it should be sealed as a protection against tampering in the field. If these, after they are manufactured, can be thoroughly sealed, it gives a certain dignity to it. The cost is slight, and it shows they are testing them, and it does not leave them open for change when installed in the country by others than the manufacturers.

The CHAIRMAN. Are there any other remarks?

Mr. IRVINE. I would like to hear from Mr. Holbrook or Mr. Johnson of the committee as to what their opinion is on this proposition?

Mr. JOHNSON. We accept it as a resolution, as it is only a recommendation for the consideration by the committee at the next conference. Is that your intention, Mr. Smith?

Mr. SMITH. It is my intention, if the conference approves of this sentiment, to incorporate that in any specifications which I might promulgate or be instrumental in promulgating in my own State, believing, as I do, that it is a desirable regulation. I might say further that I would have referred this to the committee for their attention had time permitted.

Mr. JOHNSON. If the resolution in any way binds the conference or binds the conference committee, I do not believe it advisable to consider it.

Mr. SMITH. If I may repeat the wording of the resolution, it is that the manufacturer should seal these devices and should test these devices. None of the specifications become effective in our jurisdiction until they are promulgated in our own States or cities, and if it is the sense of the conference that that is a desirable regulation, I would like to have an expression of that sentiment as an assistance to me in backing me up in promulgating such regulations in Wisconsin.

Mr. JOHNSON. I do not believe I would presume to speak for the conference committee. I believe a resolution of that character should have been submitted to the specifications committee prior to this time, in justice to it. Do you not think so, Mr. Smith?

Mr. SMITH. The matter was submitted in the form of an amendment, and I was informed that it was too late for the matter to be handled as a committee matter. Consequently, I have presented it in the form in which I now present it.

The CHAIRMAN. It has to do with the work of the committee on tolerances, as I understand. If anything is done or issued in regard

to it, it would be in connection with the committee's report, would it not?

Mr. SMITH. I should be very glad to have this matter handled as a committee matter. In fact, that was my original suggestion and desire, and I would be very much pleased to have it incorporated in the final set. Since the conference has taken action on the set as a whole I think that is important.

The CHAIRMAN. Anything affecting that ought to come through the committee.

Mr. HOLBROOK. Certainly there is no objection of the committee to that regulation which Mr. Smith proposes, but the only question which arises in my mind is, Should we, in the morning of the last day, adopt the specifications as a whole and then in the afternoon reopen them and have those who are not present here this afternoon, but who were present here in the morning, see something which they never passed upon included when the report is issued? Certainly if Mr. Smith merely desires the opinion of the members of the conference as to the feasibility or practicability of a regulation which he proposes, as a member of the specification and tolerance committee, I might say that personally the regulation seems to be all right, and if he just desires a statement from the conference that it is all right for adoption in the State of Wisconsin I can see no objection to it. There might be some question, when it has been considered that these things are concluded, about opening them up to insert something. If Mr. Smith did that it is very probable that other members of the conference might suggest something on a very much more important matter along the same lines, and it would not receive sufficient attention from this handful of delegates whom we have here at the present time.

Mr. SMITH. Mr. Chairman, I appreciate the sentiment expressed by Mr. Holbrook, and that was the reason for not offering it as a specification. I offer it as a resolution, to get the expression of opinion of the men who are here.

Mr. HOLBROOK. I will support the resolution, Mr. Chairman.

(The resolution was put to a vote and was agreed to.)

REPORT OF COMMITTEE ON RESOLUTIONS.

The CHAIRMAN. Is the chairman of the committee on resolutions here?

Mr. MOTE. Yes, sir. I would like to ask, first, Mr. Chairman, what the opinion of the conference is. Are the resolutions which are to be read to be taken up all at once or separately?

The CHAIRMAN. Separately.

(At this point Mr. Charles G. Johnson, vice president, assumed the chair.)

Mr. MOTE (reading):

RESOLUTION IN RE STANDARDIZATION OF BREAD.

Whereas the Thirteenth Annual Conference on Weights and Measures realizes the imperative need of uniform standardization of the loaf weight of bread in order to protect the purchasing public: Therefore be it

Resolved, That this conference indorses the principle of a standard-weight loaf of bread and urges the passage by the several States of legislation tending to bring about the adoption of such a uniform standard.

The ACTING CHAIRMAN. You have heard the resolution. What is your pleasure? All in favor say "Aye;" contrary, "No." The resolution is adopted.

Mr. MOTE (reading):

RESOLUTION IN RE CERTAIN WORK OF THE BUREAU OF STANDARDS.

Whereas, the members of the Thirteenth Annual Conference on Weights and Measures believe that the valuable assistance and advice which they have always received from the National Bureau of Standards are based upon the scientific research work conducted by that bureau, and believe that any curtailment of this research work would seriously interfere with the practical field operations carried on by them in their various jurisdictions: Therefore be it

Resolved, That we, the members of the conference, record our conviction that any diminution of the research work of the Bureau of Standards is to be deplored, and that this research work should be further developed to the end that the States and cities of the United States may continue to receive that assistance and advice from the bureau so essential to the furtherance of our work.

The ACTING CHAIRMAN. Gentlemen, you have heard the resolution. It has been moved and seconded that it be adopted. All in favor say "Aye"; contrary minded, "No." It is adopted.

Mr. MOTE (reading):

RESOLUTION OF THANKS TO EDITOR OF "SCALE JOURNAL."

Resolved, That a vote of thanks be tendered by the Thirteenth Annual Conference on Weights and Measures to Mr. J. A. Schmitz, the editor of the Scale Journal, for the splendid support and the valuable cooperation extended by him to the weights and measures officials of the United States and to the weights and measures movement in this country.

The ACTING CHAIRMAN. You have heard the resolution. All in favor say "Aye"; contrary minded, "No." It is so ordered.

Mr. MOTE (reading):

RESOLUTION OF APPRECIATION TO VARIOUS MEMBERS OF THE BUREAU OF STANDARDS.

Resolved, That the Thirteenth Annual Conference on Weights and Measures does hereby gratefully acknowledge by a vote of thanks their sincere appreciation of the favors made possible by the untiring efforts of Dr. S. W. Stratton, Mr. L. A. Fischer, the members of the Weights and Measures Division, and other members of the Bureau of Standards.

The ACTING CHAIRMAN. You have heard the resolution. All in favor say "Aye"; contrary minded, "No." It is so ordered.

Mr. MOTE (reading):

RESOLUTION IN RE STANDARDIZATION OF PACKAGES.

Whereas we, as weights and measures officials, realize that our present laws requiring the quantity of the contents to be marked upon food in package form fail adequately to safeguard the public in the purchase of commodities so put up: Therefore be it

Resolved, That this, the Thirteenth Annual Conference on Weights and Measures, record its conviction that standardization of packages is vitally necessary for the proper and complete protection of the purchasers of commodities so packed.

The ACTING CHAIRMAN. You have heard the resolution. Is there any discussion?

Mr. FRARY. Have you discussed the approval of the pending bill to amend the food and drugs act? I think it ought to be commended here. It is a splendid bill. It prevents the slack-filled and the deceptive package.

Mr. MOTE. The committee would be glad to accept an amendment to this resolution.

Mr. ROBERTS. I think the gentlemen refers to the so-called "Vestal bill."

Mr. MOTE. It is a proposed amendment to the national food and drugs act. I do not think it is the Vestall bill. It is No. 101 on the House calendar.

Mr. FRARY. The bill amends the definition of misbranding by including therein any container which is deceptive as to its form, shape, or size; and further provides that a package shall be deemed to be misbranded unless it is filled as full as may be within good commercial practice—some words to that effect. This was spoken of yesterday, or day before yesterday. This bill takes care of that slack filling. It is a splendid bill, and I thought the committee had it in mind, otherwise I would have mentioned it. It seems as though the resolution itself should carry something very definite with regard to the legislation that the gentleman has spoken of.

Mr. IRVINE. If we could include in that all packages and their contents, I think all members of the conference will be in favor of a resolution of that kind.

Mr. ROBERTS. I am inclined to believe that I am in entire sympathy with the bill that the gentleman mentions, but I do not know what the title of the bill is. I thought, when he first mentioned the bill, that I had read it. I also doubt the wisdom of the conference indorsing the bill without having the bill itself presented to the conference, and I think we should know that exact terms of the bill before we indorse it.

The ACTING CHAIRMAN. I think so, too.

Mr. ROBERTS. I think we could pass a resolution to the effect that this conference favors an amendment to the food and drugs act, which would require merchants to discontinue the slack filling of packages.

The ACTING CHAIRMAN. That appears to be of sufficient importance to warrant a special resolution. The Department of Agriculture has an entire bureau concerned with that question at the present time, and they have made extensive researches throughout the United States.

Mr. MOTE. The resolutions committee should prepare a resolution and submit it later to be included in the records. We might later desire to refer to this legislation which the gentleman has mentioned after we have had an opportunity to read the proposed act.

Mr. ROBERTS. I might suggest that it would be unwise for the conference to indorse a specific bill unless they knew exactly what was in the bill. I am inclined to favor such a resolution as is proposed; that is, a resolution favoring enactment of legislation of a certain kind; but I do not think we should indorse a certain bill unless we know what is in that bill.

Mr. SCHWARTZ. Will you not have that resolution reread—the resolution that is now before us for consideration?

(Mr. Mote reread the resolution.)

Mr. SCHWARTZ. I believe that resolution is appropriate, and I move its adoption. I think we ought to put ourselves on record for standardization of goods in package form.

The ACTING CHAIRMAN. You have heard the resolution. What is your pleasure? All in favor say "Aye," contrary minded, "No." The motion is carried. If there is any other resolution necessary to cover this matter, it might be wise to introduce another one.

Mr. MOTE (reading):

RESOLUTION IN RE FEDERAL SERIALIZATION OF TYPE OF APPARATUS.

Resolved, That we, the delegates of the Thirteenth Annual Conference on Weights and Measures in convention assembled, realizing the imperative need that exists for uniform regulations governing the type and construction of weights and measures and weighing and measuring devices used for commercial purposes throughout the United States, go on record as heartily indorsing legislation designed to secure serialization of the type and construction of such apparatus by the National Bureau of Standards.

The ACTING CHAIRMAN. You have heard the resolution. What is your pleasure? All in favor signify by saying "Aye," contrary minded, "No." The resolution is adopted.

Mr. MOTE (reading):

RESOLUTION IN RE SALE OF DRY COMMODITIES BY WEIGHT.

Resolved, That we, the delegates of the Thirteenth Annual Conference on Weights and Measures in convention assembled, indorse the principle of the sale of all dry commodities by weight in so far as this method of sale is practicable, and respectfully urge upon Congress the imperative necessity of enacting legislation designed to put this method of sale into force and effect throughout the United States.

Mr. ROBERTS. I want to suggest one thing to the gentleman. Just the last few words I wish he would read again.

(Mr. Mote read the resolution again.)

Mr. ROBERTS. Let me suggest that you stop at the word "effect," and strike the balance off, for this reason: I doubt myself the authority of Congress to enact a law that would put in force and effect throughout the United States such a measure as the resolution suggests, although I have not thought about it much and I may be mistaken. But Congress can pass a law putting it in effect in a certain territory. For instance, it can pass one putting it into effect in Alaska and in the District of Columbia and in any other territories of the United States. I am not sure, but I do not think off hand that Congress would have the right under the Constitution to pass such a law and put it into force throughout the United States.

The ACTING CHAIRMAN. You have no objection to the principle of the resolution?

Mr. ROBERTS. No; not at all. I believe that the adoption of my suggestion would give it more force.

Mr. MOTE. The Congress has power and authority to enact legislation on anything that pertains to interstate shipments, and that is a very important feature so far as putting the act into force. If it were put into force we know the effect.

Mr. ROBERTS. Congress can pass a law putting it into force and effect so far as interstate commerce is concerned, and in the District of

Columbia and the Territories. I am heartily in favor of the resolution, and my object is to strengthen it rather than to weaken it. I think it would give it more force. I merely suggest that to the resolutions committee.

The Acting Chairman. You have heard the resolution. All in favor say "Aye"; contrary minded, "No." The resolution as read is adopted.

In justice to Mr. Schoenthal, inspector of weights and measures of the District of Columbia, I will say that he handed me a proposed new specification reading as follows (reading):

PROPOSED NEW SPECIFICATION FOR LIQUID-MEASURING DEVICES.

Liquid-measuring devices without hose attachment discharging oil or heavy liquids through a nozzle shall be equipped with antidripping nozzles, or such other mechanical apparatus as will instantaneously cut off the flow of liquid and prevent dripping at point of discharge as soon as the handle, crank, or other means of operating the device is brought to its initial position.

The conference will not have time to consider this specification, and it will be referred to the committee to report at the next conference.

CONSIDERATION OF ADDITIONAL RESOLUTIONS.

Mr. Frary. I would like to propose this resolution (reading):

RESOLUTION IN RE DECEPTIVE FOOD PACKAGES.

Resolved, That this conference record its approval of legislation intended to prohibit the sale of slack-filled packages of food and to require that no food packages shall be so designed as to be in any manner deceptive to the purchaser as to the quantity of food contained therein.

The Acting Chairman. You have heard the resolution. What is the pleasure of the conference?

Mr. Irvine. Before we act on that resolution I would like to ask a question. In your opinion, or in the opinion of the tolerance committee, would that exclude all of these deceptive pickle bottles and things like that? My idea is to exclude all deceptive packages, such as some forms of bottles, packages with false bottoms, and cans with lids that sink in a half inch from the top.

Mr. Frary. It would be impossible to mention all the items contained in the proposed bill. It is the understanding of the House committee that the bill does cover those things.

The Acting Chairman. All in favor of the resolution say "Aye"; contrary minded, "No." The resolution is adopted.

Mr. Mote. I have been asked to present this resolution:

RESOLUTION IN RE INTERPRETATION OF WORD "TENTATIVE."

Whereas a doubt exists as to the proper interpretation and meaning of the word "tentative" or "provisional," and whereas it is the desire of the conference that said word or words be defined: Now, therefore, be it

Resolved, That the words "tentative" or "provisional" shall be considered as synonymous, with the construction and interpretation as follows for the purposes of this conference:

The words "tentative" or "provisional," as used by the conference, shall mean such contemplated use or usages to be complied with when possible, but in no sense shall either be mandatory, obligatory, or enforceable.

The Acting Chairman. Is that resolution agreeable to you, Mr. Holbrook?

Mr. Holbrook. I see no objection to it. I think that was all explained, though, this morning.

Mr. Cummings. I would like to have some explanation as to that last word "enforceable." If they are going to be tentatively adopted, they must be enforced to some extent or they will be useless. We must have some period in which they can be tried out to see whether or not they should be permanently adopted. Why not cut out the word "enforceable"?

Mr. Mote. The other two words are very binding as it is, "mandatory," "obligatory."

Mr. Cummings. If you cut out the word "enforceable," it would leave it largely to the judgment of the individual inspector in his territory, or of the State department in a particular State as to whether or not it should be enforced to any extent.

Mr. Mote. I would like to hear an expression from Mr. Smith. He has had very much to say about these resolutions so far.

Mr. Smith. I am quite willing to accept the opinion of the tolerance committee on the wording. If it is agreeable to them, it is perfectly agreeable to me.

The Acting Chairman. Gentlemen, you have heard the resolution. What is your pleasure?

Mr. Cummings. Mr. Chairman, I am inclined to think that word "enforceable" would make this particular specification ineffective. It might just as well not have been tentatively adopted. I would move that the resolution be amended by striking out the last two words "and enforceable."

(The amendment being seconded, it was put to a vote and was rejected.)

(The original motion was then put to a vote and was agreed to.)

REPORT OF COMMITTEE ON NOMINATIONS AND THE ELECTION OF OFFICERS.

Mr. Cluett. The committee on nominations recommends the following names for officers of the conference for the ensuing year:

For president, Dr. S. W. Stratton.

For first vice president, Mr. Charles G. Johnson, of California.

For second vice president, Mr. Charles C. Neale, of Minnesota.

For secretary, Mr. Louis A. Fischer.

For Treasurer, Mr. Frank Wanser, of New Jersey.

Mr. Johnson (the Acting Chairman). I will declare the election for the office of president of the conference in order.

Mr. Cluett. For President, S. W. Stratton.

Mr. Barnard. I move you, sir, that the rules be suspended and the secretary be instructed to cast a unanimous ballot for Dr. Stratton as president of the conference.

The Acting Chairman. We will suspend all formalities and declare that Dr. Stratton has been unanimously elected President for the ensuing year.

Dr. Stratton. I gave the vice chairman all the opportunity possible to show what a good chairman he is so that you might be influenced to put him in as chairman. Not that I object to holding the

office, however. I consider it a great honor, and am very pleased to serve; but I do not want you to feel that there is no one else in this organization but myself who can fill the chair. I thank you very much.

Mr. CLUETT. For first vice president, Charles G. Johnson.

Mr. CUMMINGS. I move that the same procedure be adopted.

The CHAIRMAN. All those in favor say "Aye"; contrary, "No." It is adopted and so ordered.

Mr. CLUETT. For second vice president, Charles C. Neale.

Mr. SMITH. I wish to move that Mr. Neale, as second vice president of this organization, be declared unanimously elected.

The CHAIRMAN. You have heard the motion. All in favor say "Aye"; contrary, "No." It is carried and so ordered.

Mr. CLUETT. For secretary, Louis A. Fischer.

Mr. JOHNSON. I move the same procedure.

The CHAIRMAN. All in favor say "Aye"; contrary, "No." The motion is carried and it is so ordered.

Mr. CLUETT. For treasurer, Frank Wanser.

Mr. JOHNSON. I move the same procedure.

The CHAIRMAN. All in favor say "Aye"; contrary, "No." The motion is carried and it is so ordered.

Mr. CLUETT. As members of the executive committee, the officers to be ex-officio members, as follows:

Messrs. Francis Meredith, F. G. Barnard, W. F. Cluett, T. F. Egan, D. A. Gregg, J. J. Holwell, T. L. Irvine, H. A. Webster, J. W. Richardson, S. C. Dinsmore, C. M. Fuller, J. Sweeney, J. M. Mote, T. F. Mahoney, G. G. Frary, R. W. Smith, G. B. Stewart, W. T. White, Leo Stuhr, A. F. Bove, W. F. Steinel.

(This list of names was written on the blackboard at the front of the room.)

The CHAIRMAN. You have the list on the board. Is it your pleasure to vote on the whole number at once, or one by one?

(A motion was made and seconded that the names be voted on collectively.)

It is moved and seconded that we vote upon these collectively; that is, that the ballot be cast for these members as a whole, for the executive committee. All those in favor say "Aye"; contrary, "No." It is carried. We will now vote for the members of the executive committee. All those in favor of these gentlemen as members of the executive committee say "Aye"; contrary, "No." It is carried and so ordered.

Mr. JOHNSON. Mr. Chairman, I want to express my gratification to the chairman of the nomination committee, and, while on the floor, I take the occasion to make the motion that the committee be discharged with a vote of thanks.

The CHAIRMAN. Those in favor say "Aye"; contrary, "No." The ayes have it. I want to congratulate the committee. As the work grows larger the preparation of the programs and the active work will fall on the executive committee, and it seems to me that this is a very good one. Is there any other unfinished business?

Mr. MOTE. I would like to say that one of the statements made in that pamphlet we discussed was to the effect that this was a body operating without even a set of by-laws. I just wished to ask the

question whether or not it would be well that a committee be appointed to draft a set of by-laws for this conference, or organization.

Mr. FISCHER. I will say, Mr. Chairman, that at one time we had a committee of that kind and they submitted a report, and it almost disrupted the organization. Whether we have reached a point where we will stand for being organized or not I do not know. I can say that I think we had better leave it where it is. The former difficulty centered about who were members, who were not members, and things of that sort.

The CHAIRMAN. It was purely a question of drawing formal lines, which might have been objectionable, especially in the early days when we wanted to get the opinion of everyone.

Mr. STEWART. I feel that we ought to have, and I think it would be a very good thing to have, a set of by-laws, but I would most earnestly oppose it now, because I am opposed to giving any recognition whatever to what might have been said in that pamphlet.

Mr. HILL. Any body of gentlemen that can get along without a set of by-laws is a whole lot better off.

The CHAIRMAN. The fewer the by-laws the better, and they should be confined to the main essential things.

Mr. BARNARD. I respectfully request a report from the treasurer, which I think is quite important at this time, and I suggest that, after he has made his report, he proceed to collect dues, and that, during that procedure, all doors be closed.

REPORT OF THE TREASURER, PRESENTED BY A. W. SCHWARTZ FOR FRANK WANSER.

The treasurer has been called away by telegraph this morning, so that he is not here to speak for himself. He left with me a report of the condition of the treasury for presentation to the conference. The balance in the treasury is very small. Last year, as you will remember, Mr. Lincoln, who was the former treasurer, turned over to the secretary, Mr. Fischer, a check for $62.35. Probably some members of the conference do not know how that was raised. I will state that in 1916 we had a deficit on account of a proposed dinner, or something that went a little bit wrong, and we needed some money, so a request for donations was made and we got a sufficient sum and over to pay our indebtedness, and a balance of $62.35 remained. The only expense which occurred last year at the conference was $12.50, for printing of identification cards. That has been paid and there now remains a balance on hand of $49.85. From that we must deduct the expenses incurred by the present conference, which will include the printing of identification cards for this conference, tickets for the banquet, the guests that we paid for at the banquet, and any other incidental expense that may come up. The figures are as follows:

Receipts, by check from Mr. Lincoln, former treasurer	$62.35
Disbursements, to Roberts & Co., printing identification tags, 1919 conference	12.50
Balance on hand	49.85

FRANK WANSER,
Treasurer Annual Conference on Weights and Measures.

I think we ought to have some rule or regulation whereby there should be a fee, or something of that sort, to be collected from the delegates as they register on the day that they appear here. I think we have sufficient on hand to pay all bills that will be presented to the secretary, who will send them on to the treasurer, but there ought to be some way of getting a little reserve fund.

Mr. BARNARD. I will say that there is another bill that I personally held up. I was directed at the last conference to have embossed memorial resolutions for our good friends John C. Connors, John R. Willett, and James R. Smith. That has been done, but I have held the bill up because I did not want to embarrass our good friend the treasurer. It seems to me that there ought to be some money collected at this time, and that those who are not present be requested to send in their fees, because the bureau has no appropriation for these purposes. I feel that undoubtedly each and every delegate would be willing to pay something for this good work that we are carrying on.

I would make a motion that the registration fee be $1 and that it be collected at the present time.

The CHAIRMAN. All those in favor say "Aye"; contrary minded, "No." The motion is carried.

(Whereupon a collection was taken from the members present.)

ANSWERS TO GENERAL QUESTIONS.

The CHAIRMAN. Is there any further new business? Mr. Meredith, of Massachusetts, wishes to present a matter regarding shipment of coal in carload lots.

MINE-SCALE AND RAILROAD TRACK-SCALE INVESTIGATIONS OF THE BUREAU OF STANDARDS, AND THE WEIGHT OF COAL.

Mr. MEREDITH. Mr. Chairman, shortly before my arrival at the conference attention was drawn to certain short weight in buying coal in carload lots, and this apparently occurs either at the mines or at the shipping point. Mr. Cummings directed my attention to the fact that at the last conference reference was made to the mine-scale investigation, and as these two things are intimately related I would like to make an inquiry regarding this investigation.

The CHAIRMAN. The Division of Weights and Measures has conducted an investigation of that sort. Mr. Holbrook, can you give us a brief statement?

Mr. HOLBROOK. Mr. Meredith, the mine-scale investigation covers, perhaps, a little different field than you imagine. You were speaking of weights of railroad cars filled with coal shipped from the mines to the dealer or consumer. The mine-scale investigation of the bureau covers tipple scales on which coal is weighed, by means of which weights the miners' wages are determined. As far as I know, no coal is bought or sold or shipped upon a basis of tipple-scale weights. The matter that you mention, however, is intimately connected with the track-scale investigation of the Bureau of Standards.

The bureau has three equipments which proceed around the country on a schedule testing railroad track scales, which are used in buying and selling commodities or which are used in determining the freight

on goods shipped, all such material as is in carload lots. In that investigation a very large number of coal scales are tested—scales on which coal is weighed. Some of these scales are used exclusively for coal and some for coal and other commodities also. The bureau, with its limited equipment, tests all the scales possible each year, and up to the present time has tested some 3,000 scales, these being located in every State of the United States; but, without very voluminous reports, it would be impossible to tell the condition of scales tested except in a general way. I may say that about 40 per cent of all the railroad and industrial scales tested so far have been found to be within the tolerance fixed by the bureau—which is practically the same tolerance as is fixed by the American Railroad Association—and about 60 per cent of the scales have been outside of that tolerance. The tolerance is 200 pounds on 100,000 pounds, or two-tenths of 1 per cent. All scales tested by bureau equipment on some railroads have been found inaccurate. On one or two roads all scales tested by the bureau equipments have been found accurate. The other roads necessarily lie in between. Some scales are usually accurate and some are usually inaccurate. If you desire information regarding the accuracy or inaccuracy of any specific scale or scales, and will present the question to the bureau, your inquiry will be handled with our records available. Very occasionally the inaccuracies have amounted to six or seven or eight thousand pounds, or even more. Instances of gross inaccuracies, such inaccuracies that the indication of the scale could not be depended upon in any way at all as an indication of weight, have been found in our investigation. In many cases weights which are determined to fix the amount of freight charges are by agreement between buyer and seller, also used in disposing of the goods. In justice to the railroads I think it can be said that they do not accept the responsibility for weights used in that way.

Mr. Cummings. I would suggest that, if they refuse to accept, the penalty is diversion of the coal. There must be some remedy—what we are seeking is a remedy, if there is one.

Mr. Hill. I would like to ask a question. Is there any State in which 2,000 pounds is not considered a ton of coal? The reason I ask is this: Down in my town in the public schoolroom a teacher asked what was a ton of coal. Some said 2,000 pounds, but one little boy held up his hand and said 1,600. His father was an old coal dealer.

Mr. Holbrook. To answer your question, there is no State in the Union which recognizes less than 2,000 pounds as a ton of coal. There are certain jurisdictions, including the District of Columbia, which specify 2,240 pounds to the ton. That is the old long ton which is still in use in one or two jurisdictions.

The Acting Chairman. Mr. Meredith, has your question been answered?

Mr. Meredith. Yes, sir.

(At this point Mr. Johnson, vice president, assumed the chair.)

Mr. Stewart. I want to ask Mr. Holbrook where he thinks the shortage comes in between the time the coal is weighed by the railroad company and the place of delivery. For instance, you ship a carload of coal at one point, and when it is delivered you may find it two, three, four, or even five tons short.

The Acting Chairman. That subject would involve a great deal of discussion. I believe I have a folio of something like three hundred pages on that subject, which was taken in a conference between the Interstate Commerce Commission and the California State Department. If it is the intention of this conference to consider the weight of coal at the point of destination, it might be well to consider it at the next conference.

Mr. Irvine. I would suggest that the committee take that matter up as a matter for the conference next year. We have that condition to deal with. Every railroad man along the line gets his coal off these cars in transit. I think it would be a live subject.

The Acting Chairman. I would suggest, Mr. Irvine, that you prepare yourself on that subject for the next conference.

Mr. Fischer. While we are on the question of coal, it seems to me that it is well to bring up the only question that the committee has received for answer, and that is, "Is the selling and delivery of 1,800 pounds of coal and 200 pounds of slate and other waste material, for 1 ton of coal, a violation of the weights and measures laws, or should these questions be settled by civil suit?"

The Acting Chairman. That is entirely a civil matter.

Mr. Goodwin. I had a case of that kind this spring. Complaint was made to me in relation to 3 tons of coal which had been purchased, and it was called to my attention that foreign matter to the extent of 700 or 800 pounds, more or less, had been delivered as coal. I was asked to investigate the case by the fair-price commissioner of the Federal board in our city of Providence. I immediately investigated the matter and came to the conclusion that a fraud had been perpetrated as far as the purchaser was concerned, but part of the product had been used in the meantime, which made impossible any prosecution. I went to the man who delivered the coal and I told him my findings, and I said, "In your own interest, in the interest of the public, and in the interest of those people, you ought to make this thing good." He said: "Well, you have a pretty good reputation for square dealing; supposing that I select you, and if the other people are agreeable, they may also select you as arbitrator, and what you say I am willing to abide by." I went to see the aggrieved party and he said, "Yes, we would be delighted to have you take the matter up and adjust it for us." Now, I did not weigh that foreign matter that was in that coal that had been delivered, but I merely made as close an estimate as I could by careful survey, and I went back to the dealer and asked him if he would be willing to give these people 500 pounds of good coal for what was delivered for coal that was not coal. He agreed and the purchaser also agreed, so I adjusted the thing satisfactorily without any further friction. I find that the dealers as a general rule want to be honest. They have cooperated with me in everything I have asked them to do, not only in coal, but in other materials, and we have been getting good results with very little friction in dealing with these different subjects, and we have had satisfactory results for all concerned.

The Acting Chairman. Mr. Goodwin, the handling of that matter demonstrates your efficiency. While it did not come within the scope of your work, you handled the matter tactfully and rendered a service. Are there any other questions?

(At this point, Dr. Stratton, president, resumed the chair.)

SALES OF DRY COMMODITIES BY WEIGHT.

Mr. STEWART. We have the question of dry commodities by weight by Mr. Johnson, of California. We are listening for that.

Mr. JOHNSON. I treated of that matter, Mr. Stewart, under the paper which I introduced. That was covered.

Mr. STEWART. I thought it was to come up yesterday afternoon and we broke off this morning before we reached it.

Mr. JOHNSON. The paper I gave covers that subject, and while I did not want to make a statement, I believe from inquiries I have made, that the purpose of the paper was fairly well understood and that there is a sufficient amount of material in the paper to call for the earnest endeavor on the part of the weights and measures officials to take that fundamental subject seriously. I have advocated, not alone in the conference here, but publicly and on every occasion, the complete abolition and complete suspension of our dry system of measurement. That is an expediency measurement which grew up at a time before there was the up-to-date and modern equipment for the purpose of determining quantity that we have to-day, and we find in employing our more modern equipment that the old system of dry measure is entirely a conflicting element and does much to confuse the public. You can draw a conclusion when you contemplate the fact that in a quart liquid and a quart dry there is a difference of approximately 9 cubic inches. In States where dry measure is prevailing you will find that there are perhaps 75 or 80 different weight equivalents per bushel of specific commodities. We find in Pennsylvania, I believe, that they have something like 42 different legal standards of the bushel measurement when it is applied to different commodities. We find that sugar beets have a standard weight of, say, 40 pounds in Arizona, 38 in Missouri, 45 in Illinois, and on various commodities different States have different weight equivalents for the bushel; so, consequently, that can not be determined by avoirdupois weight. Even if weights per bushel were unified throughout the States, it would not save the inconvenience. I believe that while the forefathers who determined the matter and have long since passed into their final reward served humanity well, they have left this old monument behind, which I believe calls for entire relegation. So far as we are concerned in California, we do not sell commodities by the bushel, by the peck, or by the half peck—the dry measure is an unknown quantity to us.

Mr. FRARY. How are vegetables marketed?

Mr. JOHNSON. They are all sold by the pound. Everybody weighs on good scales in California. The hundredweight avoirdupois absolutely replaces the bushel measure.

Mr. CUMMINGS. I would like to ask you, Mr. Johnson, how do you regulate the sale of green vegetables, such as spinach?

Mr. JOHNSON. That is all sold by net weight. We have done something there which some of the delegates are not cognizant of. I wanted to appear modest in this matter, because we work in California all the time on this matter. We do a number of things that might be of interest. We have standardized butter. You can not buy a package of butter except in one of the standardized sizes. The standard barrel of flour has been fixed on a net-weight basis of 196

pounds. You can not buy a 48-pound sack of flour. Also, we regulate the sale of imported olive oils in the regular subdivisions of the gallon. Potatoes have been standardized in sacks in amount not less than 100 pounds. All of these matters have been gone into very thoroughly. We have standardized the amount of green peas in sacks at not less than 68 pounds. When a sack of green peas is sold it means not less than 68 pounds. Whenever a sack of onions is sold it means not less than 100 pounds. The reason for that is this: We find that the entire production of onions is confined to two classes of people, the Portuguese and the Japanese, and early in the season they sell onions by the pound. Then, when onions become plentiful, they start to sell by the sack, and not by the pound. So, consequently, they would haul onions in to-day and say, "They are still $3 a sack," and would dispose of them at that figure, because buyers would be very anxious to get them on account of the demand for fresh onions. To-morrow there would be more onions hauled, so they would say, "To-day the price is $2.65," but the sacks were growing smaller and smaller, until we have had 70 or 71 pounds to the sack. Now whenever anybody buys a sack of onions it means a quantity of not less than 100 pounds, and the price is fixed accordingly. So when we refer to selling a sack it means a certain number of pounds, avoirdupois weight, and nothing else. We have also standardized the sale of wood. Formerly there was no standardization of wood. Everybody sold by tier, armful, or sack full, and in those days we would have to telephone to the woodman and ask what constituted his particular wood measure. He would say, "I sell 82 cubic feet to the cord," and we would have to go and make the inspection on that basis. To-day to sell a cord by any other method than by the standard cord measurement is to violate the law.

Mr. CUMMINGS. To return to green vegetables: Do market gardeners have any distance to convey them to the market?

Mr. JOHNSON. No: California is productive all over the State.

Mr. CUMMINGS. With such commodities as spinach and dandelions, do you think they might shrink 4 or 5 per cent in the weight?

Mr. JOHNSON. We base all settlements at the destination point. In other words, we would make allowance for shrinkage to the consumer.

Mr. GOODWIN. Mr. Johnson, will you please give me the definition of a cord?

Mr. JOHNSON. A cord means 128 cubic feet of wood.

Mr. GOODWIN. How about a cord of stone or of manure?

Mr. JOHNSON. I never heard of those units.

The CHAIRMAN. You can submit that question to Mr. Fischer and his assistants and they can not answer that.

Mr. JOHNSON. In California the cord has been established for no other purpose than for selling wood.

Mr. IRVINE. One thing was particularly drawn to my attention by Mr. Johnson's remarks; that was the necessity for standardization. Take that standardized barrel of flour. When they ship it to California they put it up in 24½, 49, and 98 pound sacks.

Mr. MOTE. Regarding packages of flour, I just wanted to say that in the State of Ohio we started to make a survey at one time with regard to packing of flour, and to us it was amazing the number of

large mills in the State of Ohio that were marking their packages 24½, 49, and 98 pounds "net weight when packed," and to find by an investigation throughout the State that a large majority were packing it gross weight instead of net. I had occasion to go into one of the largest mills in Ohio, which at that time was packing and selling in sacks 500 barrels of flour a day. The particular grade of paper sack that they were using for the quarter-barrel or 49-pound sack we found weighed nearly 5 ounces, or something less than 1¼ pounds was the weight of the four paper sacks which constituted a barrel. In other words, that company was gaining about 625 pounds of flour a day, all due to the fact that they were packing at gross weight and selling for net. I would be glad to know of the experience that some of the other gentlemen have had in regard to that kind of flour packing.

Mr. NEALE. In Minnesota shipments are largely interstate. In some of the outer territory mills I have found that in the last year they have rather forgotten the enactment, and in some cases they are going back to the basis of gross-weight packages.

The CHAIRMAN. Is there anything further?

Mr. STEWART. Just to get the sense of the conference on it, I would like to ask one question. Is there a legal ton in any State where the State legislature has not standardized the ton?

The CHAIRMAN. There are a large number of tons, but I think only two have been standardized by law, 2,000 pounds and 2,240 pounds.

Mr. STEWART. In some States they just promiscuously call what they please a ton. That was true in West Virginia until they standardized the ton and the legislature said that a ton should contain 2,000 pounds and that all contracts should be accordingly construed, etc. It was the first time in the history of the State that we had a standard ton.

The CHAIRMAN. Most States have standardized on one or the other.

Mr. NEALE. It is mighty interesting to hear Mr. Johnson, of California, speak of conditions brought about by the changes in weights and measures in California. It strikes me to inquire how he benefits by changing ingeniously from the standard bushel to the sack?

Mr. JOHNSON. I said in my remarks that a sack of potatoes was a quantity not less than 100 pounds. We fixed the minimum weight. There was a time when potatoes were worth $5 a hundred pounds, and all legitimate merchants were selling potatoes at market value. Certain ingenious gentlemen would advertise in the papers potatoes at $2.40 a sack, and of course every housewife would immediately remember that she had paid $5 or $6 for a sack. These people would send you a sack containing 48, 50, and 60 pounds, thereby using that medium of deception to the confusion of legitimate industry and legitimate merchants. There is no maximum standard at all, but the minimum standard is 100 pounds. In barley, bran, or oats also we established a uniform fixed standard.

Mr. GORDON. Mr. Johnson, what would you do in case a merchant should advertise at so much per basket?

Mr. JOHNSON. They do not do that in California.

Mr. GORDON. You have said that you have adopted a hundred-pound sack. If an ingenious merchant said so much per sack, and

you adopt a minimum weight per sack, and some other ingenious merchant would come along and say so much per basket you could adopt a minimum weight per basket.

Mr. JOHNSON. We do not have that condition to meet. When we come to it we will try and meet it.

The CHAIRMAN. Is there any other new business?

Mr. SCHWARTZ. At this time I might state that the sum of $48 has been collected from the delegates and visitors present, and the list of names has been turned over to Mr. Fischer for checking purposes. Notices will be sent out to all those who were not present to send in their dollar.

Mr. JOHNSON. I want to leave one thought with the conference, and that is this—that it has always been my policy in concerning myself with weights and measures laws to in every instance construe them as in favor of the consumer. This is a consumer's institution. It is intended to fortify and protect those who are least able to protect themselves, or who can least afford to lose. The merchants can always protect themselves by reason of ownership, but the consuming public can not. That is an element which calls for our first serious and special concern. It has been said that we must fix a standard for a basket, and I do not personally care whether they pack berries in a basket of 36 cubic inches displacement or 40 so long as they give the public an equivalent of the weight standard.

The CHAIRMAN. It has always been interesting to me to know how the West has started at new things. One of the first electric traction lines I ever saw was in Los Angeles. I do not think I ever saw goods sold by capacity measures in California, and I have been going out there for 30 years or more. Generally the selling of goods by weight is in practice, but you will find it very difficult to introduce that same thing in the East. Nevertheless, you can trace the development of the line to the East, and it is not going to be a very long time until the practice of selling goods by weight will be all over the country.

Mr. STEWART. I just wanted to thank Mr. Johnson for doing the very thing that I wanted him to do.

The CHAIRMAN. I think that this conference has gone on record in regard to this selling by weight several times in the past. Is there anything else under new business?

STANDARDIZATION OF BREAD.

Mr. IRVINE. May I ask, in the States or cities which have a standard weight bread law, if such law contains the provision that if the loaf does not conform to the standards prescribed around its sale, it will be prohibited even if its particular weight be stamped thereon; also if any cities have such a proviso for stamping the weight thereon, and, if so, is that law satisfactory?

Mr. BARNARD. The ordinance states in our city that a loaf of bread must be 1½, 2, or 4 pounds. If it is not up to that weight we investigate the baker.

Mr. DINSMORE. Our State law in Nevada requires that if the loaf weighs more or less than 1 pound, then it must be labeled with its true net weight. That is not satisfactory, and at the next session of

the legislature I hope to see an amendment made that will standardize the loaf to 1 pound and 2 pounds.

Mr. AUSTIN. In Detroit we have an ordinance providing for the stamping of loaves of 1 pound, 1½ pounds, 2, 4, and 8 pounds, without any provision for marking of loaves of any other weights, and the stamping of loaves of one of the above weights is the only condition under which it is permitted to be sold in conformity with law. In cases of violation of law, correction is made or prosecution is had. It seems to have been very satisfactory for a number of years. At one time there was a sliding scale by which they marked the net weight when baked and, after a few years of using that system, they came into such confusion that the dealers themselves were very glad to abandon it and return to the law requiring a standard loaf.

STANDARDIZATION OF PACKAGES.

Mr. STUHR. There is one question that I would like to ask. That is in regard to the net weight—just what it covers, what you had in mind. We find small packages that are marked in grams—55 grams for instance. We have other packages marked 1⅝ ounces. We find extracts marked in drams. I would like to know if that point has been covered by resolution.

Mr. CUMMINGS. The one in regard to standardization of packages I believe would cover that.

The CHAIRMAN. You could not prevent the marking mentioned if they choose to do it.

Mr. STUHR. You will find them marked in grams—55 grams, for instance—in dry measure and in the case of liquids in drams. I think there should be a standardization, with enough difference in the standard sizes to make them readily discernible. Where they have almost every denomination that man can think of you can not tell the difference.

The CHAIRMAN. Fifty-five grams is nearly 2 ounces, and the 2-ounce package would be the same to the eye. I think likely that is the reason for the marking of the 55 grams you mentioned. Probably it was some chemical preparation or drug, and it appeared in grams altogether; but there ought to be suitable equivalents.

Mr. STUHR. This was powdered coffee.

The CHAIRMAN. I think you will find those marks covered its approximate equivalent. Are there any other questions?

PROPOSED LEGISLATION IN RELATION TO LIQUID-MEASURING DEVICES.

Mr. SMITH. Mr. Chairman, as a member of the committee on legislation I wish to present a matter which was referred to me this morning. Since it was referred to me I have endeavored to get in touch with other members of the committee and have been unable to do so. What I have reference to is a copy of a proposition suggested by Mr. Bean and representing the opinion of several pump manufacturers. This proposed bill is for enactment locally, and they desire the indorsement of the conference on the bill for this reason, that it takes care of, or attempts to take care of, the installation feature and contains provisions such as this—that the installation shall not

be covered up until after the pump, piping, and tanks shall have been inspected. It also provides that the pump shall not be installed until a permit has been granted by constituted authority, and that it must comply with the specifications and tolerances. The proposition seems to have some valuable features. Personally I could not give any expression of opinion as to its merits because I have been unable to examine it closely, and, as I have stated, the other members of the committee have not seen it at all. I would suggest that this document be referred to the secretary for the purpose of having copies made to be placed in the hands of the committee on legislation, for them to examine and report upon at the next conference.

The CHAIRMAN. If there is no objection this suggestion will be followed out.

Before adjourning, I want to express my appreciation of the way you have conducted this conference. Certainly no other conference can compare with it as to extent of real information brought out. There has not been a day that we have not been discussing serious matters. It has been a realization of the dreams of some of us, who were in this in the early days, that the time would come when the conference would be composed of weights and measures men who were meeting these questions face to face every day. Never before have we had as much useful information given. Our discussions have been based upon experience, and that is why we can settle many of these questions quickly. They have enabled us to use discretion in the administration of ordinances and laws. I want to thank the members of the conference for the assistance they have given me in presiding over the conference.

Mr. STEWART. Has the secretary of the conference made his report? I understand that he did not have time the other day to do it and that it has not been made.

The CHAIRMAN. I have not heard any secretary's report.

Mr. FRARY. I move that the secretary's report be submitted.

Mr. JOHNSON. It has always been the custom for the secretary to include his report in the printed record, and I think that method may be followed now.

The CHAIRMAN. I think so. If there is no objection, that will stand approved.

ATTENDANCE OF DELEGATES FROM THE SOUTH.

Mr. FERNER. I have attended every one of the conferences that has been held, and in one respect it seems to me that they have not been successful: There have been very few delegates here from the South. It seems to me that we ought to get more delegates from that section, and I believe that the conference should, in its invitation, lay special emphasis on the desire for the presence of southern delegates. The conference should particularly invite them. That part of the country is one that still needs development in weights and measures.

The CHAIRMAN. I had thought, Mr. Ferner, that, as chairman of the conference, I would prepare two letters, one to governors of States who have sent delegates and the other to the governors who

have not sent delegates. The latter would contain a brief summary of what was done, with the idea, if possible, of making them see the nature of the conference. Will that answer your purpose?

Mr. FERNER. Yes, sir.

Mr. FISCHER. We took particular pains to invite those States that had never been represented before to send a delegate this year, but it seems impossible to interest them to the extent of incurring the necessary expense.

Mr. FERNER. I realize that doubtless that has been done, but the conference should adopt some resolution particularly urging that matter.

The CHAIRMAN. Have you any resolution to propose?

Mr. FERNER. I am not in a position to make a motion as a delegate.

Mr. JOHNSON. Mr. Chairman, I move that the delegates from the South be privileged to prepare a resolution, and let it be written in the records that the southern part of the United States is very much in need of weights and measures regulations.

The CHAIRMAN. The way to present it is to say that they had not attended the conference and that we wished their assistance in these weights and measures matters. I want to say, also, before we close, that the bureau extends a most cordial invitation to those of you who can do so to stay over a few days and spend them in the bureau, especially in the Weights and Measures Department. We would welcome at all times of the year visits of that sort. If any sealer finds it convenient to come to Washington for a day or two and can come into our department and study the technical side of weights and measures, we would be very glad to have you do so. Occasionally they come this way on a visit and several have stopped in for a week or more, but I wish the custom might be universal. With these remarks we will declare the conference adjourned.

(Thereupon at 3.55 o'clock p. m., Thursday, May 27, the Thirteenth Annual Conference on Weights and Measures of the United States adjourned.)

APPENDIX.

SPECIFICATIONS AND TOLERANCES FOR LIQUID-MEASURING DEVICES AS ADOPTED BY THE THIRTEENTH ANNUAL CONFERENCE ON WEIGHTS AND MEASURES OF THE UNITED STATES.

FOREWORD.

At the Thirteenth Annual Conference on Weights and Measures specifications and tolerances for liquid-measuring devices were adopted. Also a resolution was passed instructing the committee on specifications and tolerances of the conference to incorporate their conclusions in regard to which provisions should be made retroactive, which nonretroactive, and which should not be put into force and effect until some future date.

In complying with this instruction the committee issued, on June 22, 1920, "advance copies" of this material with an introduction detailing the terms of the resolution mentioned above, explaining the theory believed to be proper in arriving at their conclusions, and inviting suggestions. This material was sent to all persons attending the conference and to all manufacturers of liquid-measuring devices. Due consideration was given to all replies received before the conclusions incorporated herein were reached.

This, then, is the final copy of these specifications and tolerances. The specifications are divided by the committee into three classes: First, the specifications or portions of specifications intended to be retroactive, which are in ordinary form; second, those specifications or portions thereof intended to be nonretroactive, which are italicized; third, those specifications or portions thereof limited to take effect July 1, 1921, and thereafter to be nonretroactive, which are bracketed and carry an appropriate footnote in each case.

For an explanation of the terms used above the following paragraphs are quoted from the former specifications and tolerances adopted by the conference:

CLASSIFICATION OF SPECIFICATIONS.—The following specifications * * * shall be divided into two sets, the first to be retroactive and to apply to all apparatus immediately upon adoption of the specifications, the second to apply only to new apparatus.

For the purpose of administration the following classes of apparatus are established:

Class 1. * * * Devices which, after the promulgation of these specifications, are manufactured in the State, or brought into the State.

Class 2. * * * Devices which are in the State at the time of promulgation of these specifications, either in use or in the stock of manufacturers of, or dealers in, such apparatus.

All the specifications shall apply to apparatus of class 1.

The specifications printed in italics shall not apply to apparatus of class 2, and therefore shall not be retroactive.

The attention of delegates and manufacturers is directed to the fact that the committee on specifications and tolerances always holds itself ready to take up and consider arguments presented by anyone interested, whether these are directed to the necessity of new specifications or to the amendment of old specifications. While the com-

mittee is, of course, entirely without power to make any changes in the specifications and tolerances as adopted by the conference, nevertheless, if the reasons advanced in the manner indicated appear to be sound or the objections well taken, additions or amendments to take care of the matter will be prepared and included in the report of the committee to the next conference. In so far as it is found possible the committee will also interpret the specifications or answer questions concerning them. Communications along these lines should be sent to F. S. Holbrook, committee on specifications and tolerances of the annual conference, whose address is Bureau of Standards, Washington, D. C., for transmittal to members of the committee.

Respectfully submitted.

F. S. Holbrook,
Charles G. Johnson,
William F. Cluett,
Committee on Specifications and Tolerances, Annual Conference.

Page References to Discussion of and the Numbering of Specifications.—The tabulation given below shows in the case of each specification the pages in the body of the report upon which discussion of the specification occurs, for the convenience of the reader interested in the explanations brought out in the discussion on the floor.

The numbers assigned to specifications in this appendix and the numbers carried in the body of the report are different in some cases, since the latter numbers are those which were carried in the report of the committee, and on account of the addition of new specifications on the floor it has been necessary to renumber certain of the specifications in order to obtain consecutive numbers throughout. Therefore there has also been included in this tabulation the number assigned to each specification in this appendix and the corresponding number occurring in the body of the report.

Number used in appendix.	Number used in report.	Page references to discussion.	Number used in appendix.	Number used in report.	Page references to discussion.
1	1	67	14	13	95–96
2	2	67, 69	15	12	95
3	3	67, 69	16	14	96–98
4	4	67–69	17	15	98–101
5	5	69–71	18	16	101–102
6	6	71–76, 127	19	15	102
7	7	71–72, 76–81, 83–85, 127–137, 142–148	20	16	102
			21	17	103
			22	18	148–150
8	8	86–88	23	19	104–106, 158–160
9	9	88–94, 111, 153–158, 160–162	24	20	106
			25	21	107
10	10	94, 156–158	26	22	107–108
11	New.	150–151	27	23	109
12	11	94	28	24	109
13	New.	95			

Tolerances: pp. 110–111. General notes (*a*) p. 150; (*b*) pp. 151–153; (*c*) pp. 178–179.

SPECIFICATIONS.

No. 1. Definition.—A mechanically operated liquid-measuring device, hereinafter referred to as a liquid-measuring device, is a

mechanism or machine adapted to measure and deliver liquid by volume. Such a device often consists of a pump, or a pump in combination with other mechanism.

No. 2. PERMANENCE.—*Liquid-measuring devices shall be of such design, construction, and materials that they may reasonably be expected to withstand ordinary usage without impairment of the accuracy of their measurement, or the correct functioning of their operating or indicating parts.*

No. 3.[11] PLUMB AND LEVEL CONDITIONS.—[*The longitudinal axis of the measuring cylinder or chamber shall be accurately plumb when the device is in level.*] *All liquid-measuring devices shall be installed plumb and level and their installation shall be of such strength and rigidity as to maintain this condition.*

No. 4. MEANS REQUIRED TO DETERMINE LEVEL.—*Liquid-measuring devices, the indications or deliveries of which are changed by an amount greater than one-half the tolerance allowed, when set in any position on a surface making an angle of 5 per cent or approximately 3 degrees with the horizontal, shall be equipped with suitable means by which the level can be determined and established, such as a two-way or a circular level, a plumb bob, leveling lugs, etc.*

No. 5.[11] [UNITS OF DELIVERY.—*Liquid-measuring devices shall have the following discharge capacities per stroke or cycle, and these only: One gallon; a multiple of the gallon; or a binary submultiple of the gallon—that is, the quantity obtained by dividing the gallon by the number 2 or a power of the number 2: Provided, however, That a device may be constructed to deliver other amounts than the above, corresponding to predetermined prices at a definite price per gallon but in such cases the device shall be so constructed that the price per gallon at which it is set at any time must be clearly indicated to the customer by automatic means.*]

No. 6. INDICATION OF DELIVERY REQUIRED.—All liquid-measuring devices shall be so designed and constructed that the amount delivered will be clearly and definitely indicated by automatic means, and the indication of any delivery shall take place only when the full discharge has in fact occurred: Provided, however, That the requirement that the full discharge shall have been completed before registration shall not apply to the dribble flow caused by the displacement of the piston rod during the return of the piston to its initial position, *when a clear statement conspicuous to the customer and adjacent to the indicating means is placed on the liquid-measuring device to the effect that the full amount can not be delivered until the piston or the pointer or indicator has been returned to its initial position.*

No. 7. SENSITIVENESS.—*All liquid-measuring devices shall be so designed and constructed that they can readily be operated to deliver each quantity for which a graduation, stop, overflow pipe, or other indicating means is provided within the tolerance on such amount hereinafter provided.*

This specification shall be construed to require that in the case of all devices which have a graduated scale or dial or similar indicating means as the sole means of determining the amount of liquid

[11] It is recommended that that part of the specification inclosed in brackets be not put into force and effect until July 1, 1921, and thereafter be considered nonretroactive.

discharged, the length on the scale or dial equivalent to the tolerance at any graduation must be readily appreciable when the character of the indicating element and its normal distance from and position in reference to the observer's eye are taken into consideration, and in no case shall this length be less than 0.04 inch. For example, if a device is designed and constructed so that (1) 1 gallon is the first graduation; (2) there is no stop, overflow pipe, or other automatic means of terminating the delivery; (3) the graduations are equally spaced; and (4) if the cross section of the measuring chamber is the same throughout its length, the minimum length on the scale or dial shall be 4.6 inches per measured gallon, the maximum cross sectional area of the measuring chamber shall be 50 square inches, and if cylindrical the maximum diameter must be 8 inches.

NOTE.—The second paragraph of the above specification was adopted tentatively only. For the conference interpretation of the word "tentative" see text of resolution adopted by the conference and incorporated under "General notes" at the end of these specifications and tolerances.

No. 8. CONSTANCY OF DELIVERY.—The amounts delivered by any liquid-measuring device shall not vary from the standard by more than the tolerances hereinafter provided, irrespective of the speed at which the apparatus is operated, and, subject to the conditions of the special test described below, irrespective of the time elapsing between operations.

For the purpose of test the condition of the device shall be such that a period of nonuse of one hour shall not result in an error of the first delivery of the device after such period of nonuse greater than the tolerance allowable on the smallest amount which the device is designed to deliver, and a period of nonuse of six hours shall not result in an error of the first delivery of the device after such period of nonuse greater than 10 cubic inches, or in the case of a new liquid-measuring device, 5 cubic inches.

NOTE.—In the special elapsed-time test described above allowance shall be made for errors due solely to a change in volume of the contained liquid resulting from temperature variations alone, since an error of this character is unavoidable in the case of volumetric measurements of this kind when the apparatus is standing unused. This change in volume due to temperature variations is, however, small in amount for all ordinary variations of temperature, amounting in the case of gasoline to about 0.7 per cent for each 10° Fahrenheit change of temperature, or about 1.3 per cent for each 10° centigrade change of temperature.

In applying the six-hour test it is recommended that the delivery be not made through a hose, since the amount of gasoline necessary to wet the inside of the hose will cause an additional shortage in the delivery.

No. 9.[12] INDICATING AND REGISTERING PARTS.—Counters and graduated scales and dials used on liquid-measuring devices to tally sales and deliveries to individual purchasers or to indicate the amount delivered when any portion of the cycle or stroke has been completed shall be of such size and style and shall be so located and disposed that they are clearly visible to and readable by the customer from any position which he may reasonably be expected to assume. The graduations shall be of such character and arrangement that

[12] It is recommended that that part of the specification inclosed in brackets be not put into force and effect until July 1, 1921, and thereafter be considered nonretroactive.

the major ones are clearly distinguishable from the minor ones; [*the graduations on all linear scales shall be parallel to each other and perpendicular to the longitudinal axis of the measuring chamber. In all types of liquid-measuring devices which have a graduated scale as the sole means of determining the amount of liquid discharged, the width of the graduation marks shall not exceed 0.04 inch.*]

No. 10.[13] Pointers and Indicators.—All pointers and indicators which when used in conjunction with a graduated scale or dial indicate the amount of liquid discharged or the value of the delivery at a predetermined price per unit of volume shall be so shaped that a correct and accurate reading is given. [*Pointers and indicators are required to be symmetrical about the graduation lines at which they may stand.*] *The width of that part of the pointer or indicator which reaches to the finest graduation marks shall not be greater than the width of such marks.*

No. 11. Parallax.—*All liquid-measuring devices in which the accuracy of the readings of any indicating mechanism is affected by parallax shall be so designed and constructed as to reduce the errors due to this cause to a minimum.*

No. 12. Graduated Scales to be Secured.—When a liquid-measuring device is provided with a graduated scale or dial, this scale shall be riveted to its supports or otherwise permanently fixed in position: Provided, however, That in the case of liquid-measuring devices of the gauge-glass type a sliding scale will be permitted when the displacement of such scale is, by suitable means, automatically prevented at all times when liquid is being discharged from the delivery outlet.

No. 13. Numbering of Graduations.—*Figures defining the value of graduations shall be uniformly placed in reference to the graduation lines and shall be in regular sequence; that is, sequences such as 5, 1, 2, 3, 4 shall not be permitted.*

No. 14. Scales in Opposite Directions Prohibited.—The use on a liquid-measuring device of two graduated scales reading in opposite directions and referable to the same indicating means shall not be permitted.

No. 15. Lettering, Graduations.—*All markings, instructions, and graduations required under these specifications shall be of such size, design, and location that they will not tend to become obliterated by dirt or oil, or for any other reasons tend easily to become illegible.*

No. 16. Return of Indicating Element to Zero.—All liquid-measuring devices shall be so designed and constructed that the indicating element used in tallying deliveries to individual purchasers is returnable readily to a definite and clear zero reading before the next delivery is begun.

No. 17.[13] [Stops to be Positive.—*When the stops or other stroke-limiting devices on a liquid-measuring device are subject to direct pressure, or impact, in the operation of the device, such stops shall be of such construction that the permanence and security of their positions is provided for by a positive, non-frictional engagement of the parts whose relative motions are to be prevented. Such stops*

[13] It is recommended that that part of the specification inclosed in brackets be not put into force and effect until July 1, 1921, and thereafter be considered nonretroactive.

shall be so designed and constructed that adjustment within the prescribed tolerances can be made.]

No. 18. Stop Mechanism to be Definitely Positioned.—All liquid-measuring devices designed to deliver two or more different predetermined amounts by bringing into operation different stops or other means of defining the delivery, shall be so designed and constructed that the position for the proper setting of each stop is definitely and accurately defined, inadvertent displacement from this position is obstructed, and the delivery for which the device is set at any time is clearly and conspicuously indicated.

No. 19. Provision for Sealing.—*All devices, adapted to be altered for adjusting or correcting the delivery of a liquid-measuring device, shall be of such construction that they can be sealed, either separately or together, in such a manner that the position of none of them can be changed without destroying the seal or seals: Provided, however, That this shall not apply to such devices as alter the price and consequently the delivery of such a liquid-measuring device as is described in the proviso of specification No. 5.*

No. 20. Use of Adjustments.—No adjustments of the delivery of a defined-stroke liquid-measuring device shall be permitted, except that intended to produce a piston displacement per cycle of 231 cubic inches per indicated gallon of delivery. Adjustments of piston displacement to correct for leaks, slippage, excessive length of pipe line, or other defects of the installation shall not be permitted.

No. 21. Diversion of Measured Liquid.—All liquid-measuring devices shall be so designed and constructed that no portion of the measured liquid can be diverted from the one discharge outlet through which delivery is being made or to be made during the operation of the liquid-measuring device.

This specification is to be construed to require that there shall be no means provided by which any of the measured liquid can be diverted from the measuring chamber or the discharge line to the supply tank or elsewhere, during the period of operation, and that all valves in the supply line intended to prevent the reversal of flow of the liquid shall be of such design and construction that their closure is automatically effected in the use of the device. Also when two or more discharge outlets for the liquid are provided all outlets except the one in use must automatically be tightly and completely closed off during the period of discharge: Provided, however, That the above shall not apply to the drain outlet from the filtering chamber when such outlet is in plain view of the customer.

No. 22. Shut-off Valves in Discharge Line.—Only one shut-off valve or cock which can be operated by hand for the purpose of cutting off the flow of liquid shall be permitted in the discharge line of a liquid-measuring device. A second shut-off valve or cock may be provided in the case of a liquid-measuring device equipped with a hose and designed and constructed so that it must be operated with the hose full of liquid at all times, but such second valve or cock shall be so designed and constructed that it can only be closed off by the use of some tool or device which is outside of and entirely separate from the measuring device itself, such as a wrench, screw-driver, etc., but not an adjusting pin.

This specification is not to be construed as allowing two shut-off valves or cocks in the case of devices in which the hose or any part

thereof can be drained of liquid after the actual mechanical operation of the mechanism of the liquid-measuring device is discontinued in any way except as follows: (1) by means of the mechanically operated valve, or (2) by delivering from the measuring device more than the full measuring capacity thereof during the actual mechanical operation of the mechanism thereof.

When under the terms of this specification only one shut-off valve or cock is allowable, this shall be located as near as possible to the measuring device itself, and not in the hose line or at the extremity of the hose.

No. 23. Drainage of Discharge Line.—All liquid-measuring devices shall be so constructed and installed that they will provide for the complete and rapid drainage, to a definite and uniform level, of the liquid contained in the hose or outlet pipe, and will not permit a siphoning or a continuous trickle of liquid from the discharge outlet after the operation of the mechanism is discontinued.

This specification will be construed to require that if hose is used its inlet end shall be at least 5 feet above the normal level upon which the receiving vehicle or vessel stands and the liquid-measuring device shall be equipped with an automatic vacuum breaker or equivalent means to insure the complete and rapid drainage of the hose, that is required by the above. The hose shall be properly reinforced and shall be of such length and stiffness that no movable portion thereof will be readily disposed in such a way as to tend to retain liquid after the operation of the device is completed: Provided, however, That this specification shall not be construed to apply to devices which, under the terms of specification No. 22, may be equipped with two shut-off valves or cocks and are to be operated with the hose full of liquid at all times.

No. 24. Limiting Height of Suction Lift.—No defined-stroke piston-type, liquid-measuring device shall be so installed as to work under a total suction head sufficient to cause vaporization of the liquid for which it is used under the highest temperature and lowest barometric pressure likely to occur.

No. 25. Use Limited to Certain Liquids.—*Liquid-measuring devices which will not give correct results except when used with liquids having particular properties, as for example, high viscosity, shall be conspicuously, clearly, and permanently marked to indicate this limitation. Such wording may take the form, "Not suitable for gasoline or light oils," "Use only for molasses or heavy oils," or "For viscous liquids only."*

No. 26. Computing Charts.—*The value graduations on all computing charts used on liquid-measuring devices shall not exceed 1 cent at all prices per gallon up to and including 30 cents. At any higher price per gallon the value graduations shall not exceed 2 cents: Provided, however, That nothing in the above shall be construed to prevent the placing of a special value graduation to represent each 5-cent interval. These special graduations may take the form of dots, staggered graduations, or similar forms. They shall be so placed that their meaning and value may be clearly understood but they shall not be placed in the space between the regular graduations.*

No. 27. Fraudulent Construction Prohibited.—All liquid-measuring devices shall be of such construction that they are not designed to and may not be used used to facilitate the perpetration of fraud.

No. 28. METRIC SYSTEM.—No specification contained in the preceding pages shall be understood or construed to prohibit the sale or use of liquid-measuring devices constructed or graduated in units of the metric system.

The tolerance to be allowed on any liquid-measuring device constructed or graduated in units of the metric system shall be the same as those specified on similar apparatus of any equivalent size or at an equivalent capacity in the customary system.

TOLERANCES.

The tolerances to be allowed in excess or deficiency on all liquid-measuring devices shall not be greater than 2 cubic inches per indicated gallon. Provided, however, that the manufacturers' tolerances or the tolerances on all new liquid-measuring devices shall not be greater than one-half of the values given above; and provided further that these latter tolerances shall also be applied to all devices which are being retested after being found incorrect and subsequently adjusted or repaired.

GENERAL NOTES.

(*a*) CONFLICT OF LAWS AND REGULATIONS.—In the above specifications certain items appear which may conflict in certain jurisdictions with present State or local laws or ordinances or regulations of State or local fire marshals or boards of safety. In such cases of conflict an attempt should be made by the weights and measures officials to harmonize the two codes and, in the meanwhile, it may be found necessary to suspend the enforcement of such specifications.

(*b*) DEVICE TO INDICATE EXHAUSTION OF LIQUID SUPPLY.—The conference goes on record to the effect that it is its opinion that such a device as is mentioned in the following paragraph is a highly necessary one, and the conference gives notice that it is probable that at some future time, when it becomes apparent that there are devices on the market which will accomplish the desired purpose, an effort will be made to incorporate the following paragraph in the specifications:

All liquid-measuring devices, the accuracy of delivery of which is affected by the lowering of the liquid in the supply tank to a point at or near the intake end of the suction pipe, shall be provided with a device which will make the pump inoperable during the continuance of this condition, or shall be so constructed as to warn the purchaser and the operator in a conspicuous and distinct manner that the level of the liquid supply is so low as to endanger the accuracy of the measurement.

(*c*) RESOLUTION ADOPTED DEFINING THE WORD "TENTATIVE."—

Whereas a doubt exists as to the proper interpretation and meaning of the word "tentative" or "provisional"; and

Whereas it is the desire of the conference that said word or words be defined; now, therefore, be it

Resolved, That the words "tentative" and "provisional" shall be considered as synonymous, with the construction and interpretation as follows, for the purpose of the conference:

The words "tentative" and "provisional" as used by the conference shall mean such contemplated use or usages to be complied with when possible, but in no sense shall they be mandatory, obligatory, or enforcible.

○